6/9/26

Vol. XXIV. Part 8.

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The Journal of the Department of Agriculture of Victoria, Australia.

August, 1926.

PRINCIPAL CONTENTS

Veterinary First Aid

Lucerne Manuring

The Pig Industry

Prune and Plum Culture

Native Insect Pests of the Orchard and Garden

Minyip Crop and Fallow Competition

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CONTENTS.—AUGUST, 1926.

		PAGE
Veterinary First Aid	*E. A. Kendall, B.V.Sc.*	449
Lucerne Manuring	*L. C. Bartels, B.Ag.Sc.*	454
The Pig Industry	*R. T. Archer and A. J. Gill*	459
Late Potato Field Crop Competition (Romsey)	*J. T. Ramsay*	471
Coleraine Potato Crop Competition	*J. T. Ramsay*	472
Minyip Crop and Fallow Competition, 1925	*J. Brake, B.Ag.Sc.*	474
What the Sheep Gives Us		478
Native Insect Pests of the Orchard and Garden	*Chas. French, jun., and G. T. Levick, B.Ag.Sc.*	479
Profitable Farming—A Boisdale Farm	*A. J. Gill*	484
Old Journals Required		489
Prune and Plum Culture	*J. M. Ward*	490
World's Poultry Congress		497
Eggs and Marketing	*W. C. Rugg*	498
Tanning of Hides		503
Pig Breeding in England		504
Pig Breeding in Sweden		505
Grading of Eggs in Canada		506
Popularity of the Small Farm in France		506
Orchard and Garden Notes		507
Reminders for September		510

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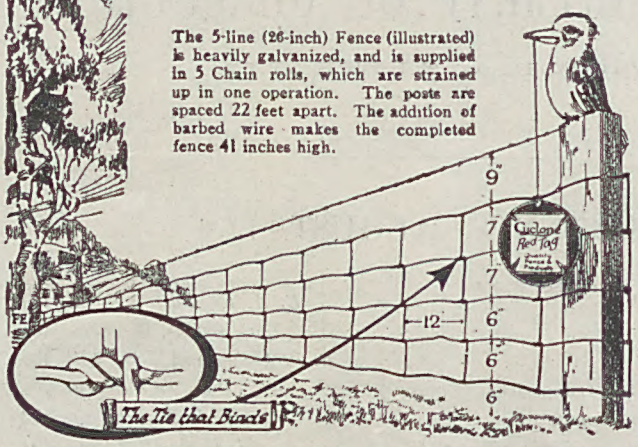

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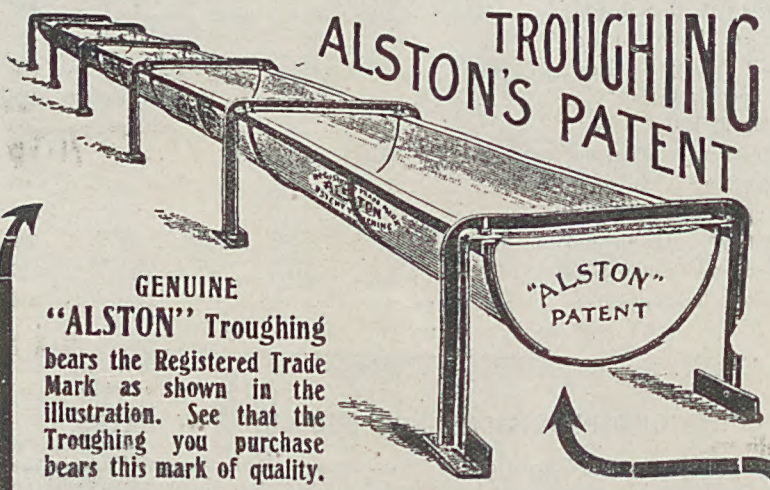

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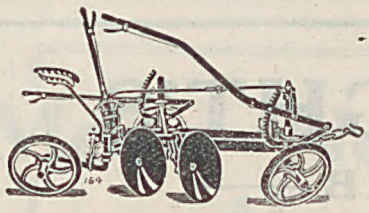

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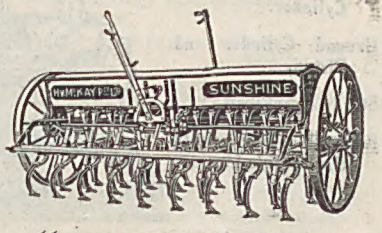

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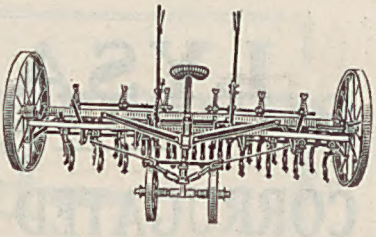

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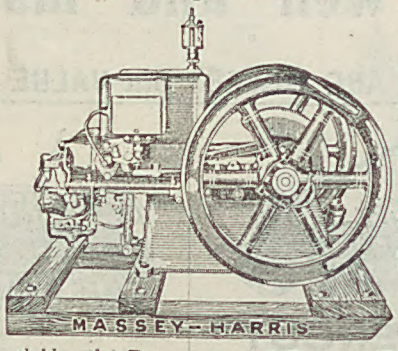

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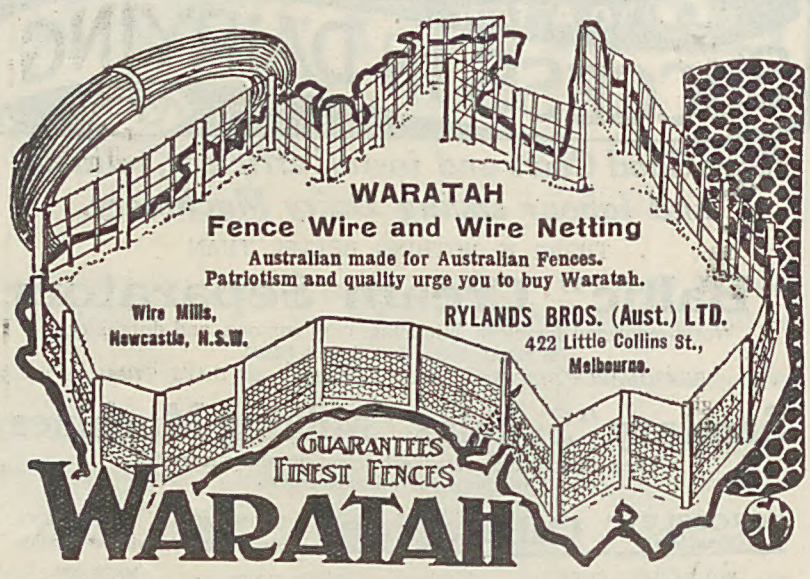

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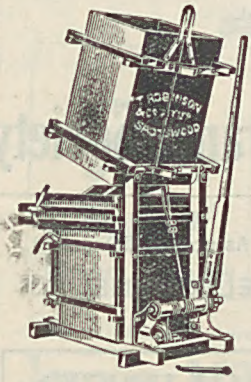

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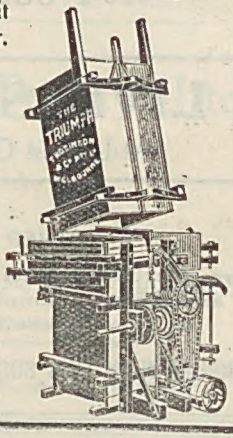

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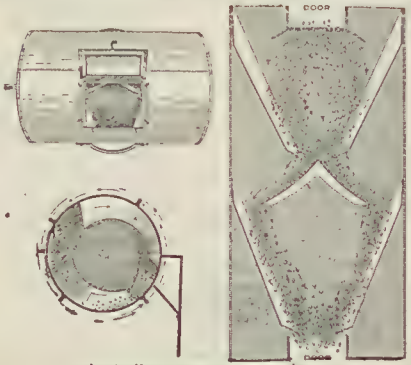

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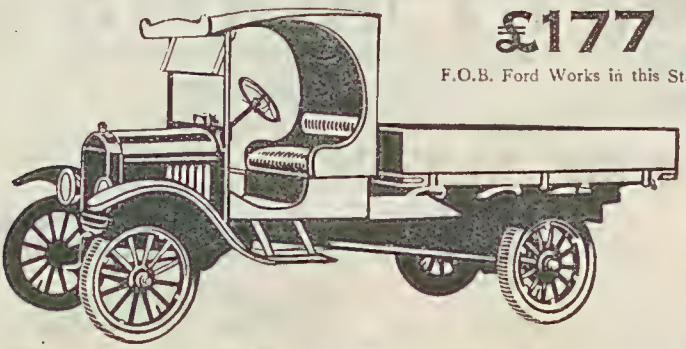

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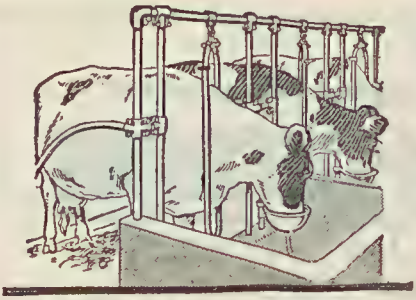

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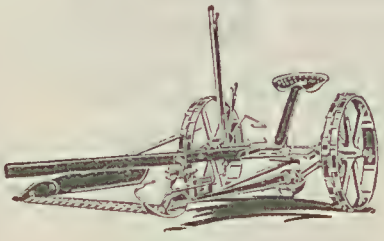

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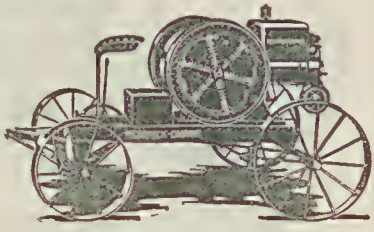

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VETERINARY FIRST AID.

WOUNDS AND ANTISEPTICS.

An Address by E. A. Kendall, B.V.Sc., Acting Chief Veterinary Inspector, broadcast through 3LO.

As every stock-owner knows, all animals are liable to sustain injuries; often, maybe, serious enough to cause him some concern, particularly in the case of valuable animals. Common amongst injuries are wounds of various kinds. It is, therefore, proposed to give you a little first-aid instruction regarding wounds and their treatment, which may be useful, especially to those out of the reach of professional assistance.

Wounds are variously described as incised or clean-cut, lacerated or torn, contused, punctured, and so on.

Incised or clean-cut wounds are caused by some sharp-edged article, e.g., a knife, piece of glass, broken metal, a plough-share; in fact, anything which has a sufficiently sharp edge to produce a cutting effect. Such wounds may be easily recognized by the cut appearance of the skin and flesh. They may be dangerous because of the bleeding, which is more likely to occur in these than other kinds. Sometimes large blood-vessels are severed, and early collapse of the animal may follow.

Lacerated or torn wounds, as the term implies, show irregular or jagged edges, the result of some object tearing its way through the tissues. They are commonly caused by contact with a nail, hook, barbed wire, stump, or broken branch of a tree. Bleeding from these is not usually so free or alarming as in clean-cut wounds, though occasionally it is serious when a blood-vessel is actually torn apart. Even then it is not quite so dangerous because the blood-vessel stretches more or less before it gives way and the broken ends recoil. This tends to lessen the volume of escaping blood.

A contused wound is one caused by a violent blow of some kind, such as a kick, a heavy fall, or by colliding with some object. The tissues are literally burst open. Bleeding is not a conspicuous feature.

because the larger blood-vessels usually escape injury. The damaged skin and flesh will, however, be saturated with blood from the broken muscles. These wounds may be dangerous, not from the bleeding, but because the bruised and broken flesh may become mortified.

Another kind of wound that may have serious consequences is the punctured wound. These are caused by such objects as a nail, prong of a fork, metal peg or stake, cow's horn, or even shaft of a vehicle. Their size and depth vary according to the instrument causing them; some indeed may be so small as to escape notice for some time. They rarely bleed, but, for several reasons, they must always be regarded with suspicion.

Germs are introduced by the offending object and transplanted into the tissue. The wound may not be discovered for some time; meanwhile blood poisoning or lockjaw may develop from the germ activity. If the wound be close to the joint, the joint cavity may be opened. Such wounds are also dangerous when the foreign body, or portion of it, is lodged in them, and when they occur in the chest or abdomen they should be carefully watched.

Besides the descriptive terms I have used, there are one or two others used in the general sense. For example, a simple wound is one which does not involve important structures or organs. It is usually confined to the skin and flesh where the bleeding is not serious and healing follows quickly.

A wound is complicated when important structures are damaged, e.g., joints, internal organs, bones, nerves, and large blood-vessels; also those in which foreign bodies are lodged.

A wound is said to be clean when no germ activity is set up. This is much the same as a simple wound.

The septic or poisoned wound is the reverse. In animals most wounds are more or less septic, for, if contamination does not occur when the wound is inflicted, it usually happens later because of the insanitary surroundings.

Treatment.

We shall now pass on to the treatment. First of all, a few words as to suitable equipment for this purpose. Antiseptic preparations are essential—lysol, Jeyes's fluid, or similar agents; carbolic acid, Condy's fluid, chloride of lime, are very useful; tincture of iodine is perhaps best, but rather expensive. If these are not available, petrol or phenyle can be used. If no recognized liquid antiseptic or disinfectant can be had, one can be made by dissolving a little washing soda or common salt in boiling water. This preparation should, of course, be cooled down before being used.

Dry antiseptics like boracic acid, or, failing this, a mixture of powdered lime and chalk, are useful for after-treatment. They should be used in the ratio of one in eight.

Cotton-wool and bandages are almost indispensable. In emergency, new, clean cheese-cloth or towelling can be used in place of cotton-wool. Bandages may be made of discarded bed sheets or tablecloths, but it is essential they should be clean.

For stitching wounds, surgical needles in three or four assorted sizes should always be at hand; but in case of emergency either pins or ordinary sewing needles may be used as makeshifts for stitching small skin wounds, sacking needles being requisitioned for large wounds. Stout thread, whipcord, well-woven twine, or ¼-inch tape will do as substitutes for cat-gut and and silk.

One or two pairs of artery forceps are valuable for clamping cut blood-vessels to enable them to be ligatured. A surgical knife and pair of scissors complete the emergency outfit.

To Stop Bleeding.

The actual treatment of a wound is largely dependent on its character and situation. I will deal with bleeding first, which is often the foremost concern. If the blood is merely oozing and tends to congeal quickly, there is no cause for alarm, and no special steps are needed to check it.

Where large veins or arteries are cut, it is necessary to act at once, without any preliminary dressing of the wound, for any delay may be fatal.

If possible, the bleeding vein or artery should be seized hold of with a forceps or small pincers, and tied with fine thread. A horsehair is handy for the smaller blood-vessels. If this fails to stop the bleeding, pressure on the blood-vessel should be tried. If the wound be on the leg, pressure can be best applied by placing a tightly-rolled pad of cotton-wool or a large cork crosswise against the leg near the wound, and securing it in position with a tightly-drawn bandage. The object is to press the blood-vessel against the bone. A most important point is this—if the blood be from a cut artery, the pad must be placed 2 or 3 inches above the wound; if from a vein, the same distance below the wound.

Bleeding from an artery can be recognized by the bright-red colour of the blood and the jerky way it runs; blood from a vein is a darker brick-red colour, and flows smoothly. The arteries run down the limb; the veins run upwards. Therefore, to stop a vein bleeding, pressure must be applied below the wound, and above in the case of an artery.

When the bleeding is checked or considerably lessened, one may proceed to clean up the wound and apply stitches. The method of stitching will be discussed presently.

Now, it sometimes happens that bleeding cannot be stopped either by tying up the blood-vessel or by applying a pressure bandage in the way just described—a wound about the body, for example. In such a case the next best thing is to pack the wound cavity tightly with cotton-wool or a piece of clean towel, and put two or three stitches across the wound to keep the pack in. The ends of the stitches should be left long enough to tie in a bow, so that, if in a few hours it is desired to change the pack, the stitches may be simply loosened, and not taken out. A blood-soaked pack soon becomes foul, and should be removed after six or eight hours. If bleeding commences again, a fresh pack should be placed in the wound.

Stitching of Wounds.

All open or gaping wounds that obviously require closing should be stitched. First remove any dirt and congealed blood with warm

water in which a little washing soda has been dissolved, and then flush the wound with an antiseptic solution consisting of two teaspoonfuls of lysol, creolin, or Jeyes's fluid to a pint of water. Failing these, use phenyle or solution of chloride of lime. Any loose shreds of flesh should be trimmed off with scissors, but no skin should be cut away unless it is so badly torn that it cannot be stitched.

Simple stitching with thread or fine twine usually suffices for small wounds. The stitches should be from a quarter to half an inch apart and not less than a quarter of an inch from the edge of the skin.

For large, deep flesh wounds in horses and cattle the stitching should be done with a large needle, ¾-inch tape being used. The stitches should be at least half an inch from the edge of the wound, and each stitch not less than half an inch apart.

The wound must not be closed completely, but an opening left at the lowest part to provide drainage for any discharge. This also will permit of the wound being easily flushed out with antiseptic solutions.

When the wound is healing, the stitches should not be removed too soon. In animals they are, as a rule, cut out too quickly. Any that remain when the wound has healed may be easily pulled out after snipping with scissors.

When pins are used to close a wound, both edges of the skin must be pinched between the finger and thumb to facilitate passing the pins through. Thread is wound in a figure of 8 round the point and head of each pin and tied. To remove this kind of stitch, simply pull the pins out.

After Treatment of Wounds.

If a wound be a simple one with only a small amount of discharge, it is sufficient to wipe the discharge away three or four times daily. Most of you have seen a dog licking a wound—that is his method of keeping it clean. Clean cloth or cotton-wool or cheese-cloth should be used each time the wound is cleansed. The wound should afterwards be dusted with boracic acid or powdered chalk; a tin pepper-castor is handy for the purpose.

Large, deep wounds with abundant discharge must be syringed out three or four times daily with a liquid antiseptic, e.g., Condy's fluid, lysol, or chloride of lime in water. If none of these is available, boiled water in which washing soda or table salt has been dissolved should be used. After syringing or washing, the wound should be dusted with boracic acid, zinc oxide, or powdered chalk.

In order to prevent any scalding by the discharge, the skin should be smeared with lard, vaseline, oil, or soft soap; and at all seasons, but particularly in summer, the skin around the wound should be smeared with fly-repelling dressing. A good mixture is four parts of creosote or Stockholm tar to six of turpentine and ten of olive oil. The wound should never be messed up with tar or axle-grease or such things.

Restraint is necessary sometimes to stop animals tearing or rubbing their wounds. A horse can be backed into a stall and his head tied on each side to the rear posts; or a short stick like a broom-handle can be fixed to his head-stall and a surcingle. The tail may require tying to one side to prevent the hairs being caught in the stitches.

Cattle are not so fidgety. If necessary, put a wooden triangle or fork of a sapling on the neck, similar to that used to stop them going through a fence. Smaller animals such as sheep, pigs, and dogs that have been injured may be bandaged to protect wounds. It is advisable to muzzle dogs before attending to any injury, and to keep them muzzled afterwards, so as to prevent them tearing out the stitches with their teeth.

Treatment of Contused and Punctured Wounds.

Now a word or two about the treatment of other wounds. Contused wounds, unless extensive and gaping, need not be stitched. In any case, they should not be completely closed. Adequate drainage is essential. Flush them freely and frequently with antiseptics. Condy's fluid is a very good antiseptic; iodine, of course, is better, but is costly, though it can be economically used if applied on a piece of cotton-wool tied to a stick. For this purpose tincture of iodine should be diluted with four parts of water.

Punctured wounds must not be stitched, except where an animal has been gored and internal organs are exposed. Enlarge them, if necessary, for drainage purposes by cutting the skin down to the level of the cut made. Care must be taken to see that no foreign body remains in the wound.

Nail punctures in horse's feet require special attention. Clean the hoof, pare out the horn round the puncture, inject iodine or carbolic acid, or insert a small plug of cheese-cloth or other material saturated with either of these agents. Cover with a pad of clean material, and fix a piece of leather over the sole. Repeat the dressing twice daily. Keep all manure and urine swept away from the horse's feet.

Open joints are serious and difficult to treat. They are recognizable by the clear amber or straw-coloured discharge and the hot, painful swelling round the joint. As a rule, treatment is only worth while with valuable animals or stud stock, as working animals seldom become sound even if cured. Careful injections of small quantities of peroxide of hydrogen four times daily should be tried. Horses may need slinging to rest an affected leg.

Abdominal wounds with exposure of the bowels are always dangerous and many are fatal. If treatment is attempted, the patient may require throwing. If so, protect the parts first with a sheet or tablecloth. When secured, wash all dirt and blood away, carefully replace the bowel if necessary, close the wound with strong tape, and bandage the body with a sheet to support the wound. Antiseptics should be applied only to the surface wound and never injected deeply. Small animals offer better chances of recovery than horses and cattle.

Wounds entering the chest cavity are treated in practically the same way.

Summary of Points in Treatment.

1. Determine the character and situation of the wound.
2. If practicable remove the animal to a suitable place for treatment.
3. When haemorrhage is serious attend to its first. Delay may be fatal.

4. If there be no severe bleeding, remove dirt and congealed blood; clip the hair round the edges and trim off any shreds of flesh. Save the skin wherever possible.

5. Apply freely a good antiseptic at the earliest opportunity and continue its use throughout while the wound discharges. Fall back on household agents like soda and common salt in boiled water if no antiseptic be available.

6. Stitch wounds that require it as soon as possible—leave an opening for drainage.

7. Do not stitch punctured wounds—enlarge them if necessary. Explore for foreign bodies. Flush them out frequently with antiseptic or swab with iodine if available.

8. Protect wounds from flies.

9. Keep the patient in clean and wholesome surroundings.

10. Use any practicable means of restraint to prevent further damage to the wound and to facilitate healing.

11. Keep an eye on the patient's behaviour.

LUCERNE MANURING.

An Address by L. C. Bartels, B.Ag.Sc., Senior Irrigation Officer, broadcast through 3LO.

Lucerne is the most important fodder crop grown under irrigation, and has been aptly called "The King of Fodder Plants." It is long-lived, and, when properly treated, will yield over a number of years at least five crops per annum; or, if grazed judiciously, will give an abundance of nutritious feed.

It is, however, only by due attention to several points that the irrigation farmer can obtain the highest returns from lucerne. The factors which make for highest production from established stands are:—

Careful and sufficient watering.
Liberal manuring.
Cutting at the right time; (or if the lucerne be grazed) preserving it from excessive grazing.

The Necessity for Top-dressing.

Though water plays the greatest part in lucerne production, manuring is very important, and because the present month* is a suitable time for manuring lucerne, my talk to-night will be confined to that subject.

The first and most important piece of advice to the grower of lucerne is:—

Top-dress your lucerne land liberally with superphosphate.

The practice of top-dressing lucerne-stands is extending every year; but it is far from being general yet. The progressive farmer will need no inducement to continue this work; he knows that it is profitable, but maybe my remarks this evening will interest him as an explanation

* The address was delivered on the 16th July, 1926.

of why it is profitable. Those who have not adopted top-dressing will, I trust, find encouragement to begin.

The question is sometimes asked, "Why manure land?" The answer is, "To supply a deficiency of available plant food in the soil." This will be better understood if we consider for a moment or two how plants grow. Lucerne, for example, has in its composition several elements. When a plant is burnt, the ash remaining contains the minerals which entered into its structure. Though these minerals are only a small proportion of its composition, most of them are very necessary. The plant obtains these from the soil, and they enter the roots in the soil solution. It is thus obvious that there should be certain elements in the soil, and they must be present in such a condition that the plant's root hairs can take them in. If one necessary element, such as iron, be lacking, an over-abundance of all the others would avail nothing. Generally, all the elements a plant requires are to be found in the soils in abundance, with the exception of phosphoric acid, potash, and nitrogen.

Save in certain specialized forms of farming, such as fruit-growing, potato-growing, maize-growing, vegetable-growing, &c., nitrogenous and potassic manures are not usually required in Victoria, but, generally speaking, most of our Victorian soils lack phosphoric acid, and when we apply superphosphate, we are making good this deficiency.

Perhaps you may be inclined to ask:—

What is the best form of manure to apply?
When is the best time to top-dress?
How can the manure be best applied?
What is the right quantity?

I have already stated that the great need is for phosphatic manures, and of the various forms in which it is available, I may mention bone-dust, bone fertilizers, superphosphate, basic slag, basic phosphate, and ground rock phosphate, &c.

Of these superphosphate is the best for lucerne. In all our tests, it has given the greatest return for the least outlay. Why should it be the best? The answer is, because in superphosphate the phosphoric acid is most easily available to the plant. In fact, the object in the manufacture of superphosphate is to make the insoluble phosphate of rock phosphate soluble in the soil solution, so that it may be absorbed by the plant. You will notice from the statement of the analysis of superphosphate, which the law requires to be attached to each bag, that it contains 20.5 per cent. water soluble, and .5 per cent. citrate soluble. Learn to appreciate the fact that it is the availability of the phosphoric acid that counts, and you will have a better understanding of the relative values of the different forms I have mentioned.

Two or three years ago, I met a settler who told me he used rock phosphate on his land. "Its cheaper than superphosphate," he said; "and it contains twice as much phosphoric acid." This was true, and I had work to convince him that the value of a manure depends on the availability of its elements. Fortunately, the results from our plots demonstrated it for him most convincingly. Rock phosphate is calcium phosphate. It is brought to Australia mainly from Nauru and Ocean Island.

In some of the coral islands of the Pacific, countless numbers of sea-birds made their nests for ages, and the accumulated debris—their own remains, excreta, fish bones, &c.—have rotted there forming guano, and the phosphates have been gradually leached down into the coral forming an insoluble combination. In the manufacture of superphosphate the object is to loosen, as it were, the combination of phosphoric acid and calcium by the action of sulphuric acid.

Many farmers favour the use of bonedust, but the evidence from our experimental plots goes to show that for lucerne superphosphate is the superior fertilizer. Stable manure is a valuable manure for top-dressing not only lucerne, but all farm crops, and all the well-rotted stable manure that is available should be put on the land.

I have not, so far, mentioned gypsum and lime. These materials are not generally regarded as manures. They are what are called "soil amendments"; that is, they act on the soil so as to alter its texture, and in this way make heavy soils more permeable to water and air.

Where lime is lacking in the soil, it will be impossible to grow lucerne successfully without a top-dressing of lime. It sweetens the soil, and makes conditions more favourable for the nitrifying bacteria which live on the roots. As a matter of fact, there is a good deal of lime in the constitution of a lucerne plant. Where lime is cheaply available, it may be profitably applied to lucerne land as a supplement to the superphosphate.

We have had good results from the use of gypsum. Gypsum or kopi is found in many deposits in the Mallee, and it is simply dug out of these deposits in a condition suitable for application to the soil. Its effects in altering the soil texture have been observed. At Swan Hill, for example, it has reduced cracking, and the settlers there are fortunate in having a deposit adjacent to the flats. I should recommend the use of gypsum in all places where it may be cheaply obtained. It is necessary to put on at least 1 ton per acre. It must, however, be borne in mind that neither gypsum nor lime is a substitute for superphosphate, and little value will be obtained from the use of either unless superphosphate be applied as well.

The Time to Apply Manure and the Quantity to Use.

Manure is usually applied in July and August when the lucerne is awakening to new life, but it may be applied to advantage at any time. A farmer should never abandon the idea of top-dressing because August has passed, and manure was not available at that time. In fact, the practice is growing up of supplementing the early spring dressing with one or two applications during the growing season. This practice has a lot to commend it.

The ordinary seed-drill is commonly used for top-dressing lucerne, but the one-horse manure spreader is coming into wide use, and there is no doubt it does the work well. It drops the manure on the surface, but the first shower or rain washes it into the ground, where it is fixed. If a farmer has neither a drill nor a distributor available, he can broadcast the superphosphate by hand.

Regarding the quantity of superphosphate to apply, I can safely affirm that the use of as much as 4 cwt. per acre per annum will be well repaid, and enterprising farmers are using this quantity. Of course, many people will be unable to give their land such an application, but I would urge every lucerne grower to put on at least 1 cwt. per acre, and as their experience widens, they will no doubt use more.

I have found the younger people on irrigation blocks the most enterprising, and the settlers at such a place as Stanhope are well advanced in regard to the advantages of top-dressing lucerne.

Since the establishment of the Research Farm, at Werribee, experiments in the manuring of lucerne have been carried on, and some very definite information has been obtained. This has been shown to have a State-wide application.

In these experiments we have a number of plots of lucerne of equal area, side by side, sown with one variety of lucerne. In the matter of watering and general care, all the plots are treated alike, except that the application of fertilizers to each varies. A few, described as check plots, are given no manure whatever. To some, superphosphate in quantities varying from ½ cwt. to 4 cwt. is applied. Some are manured with basic slag, rock phosphate, or bone fertilizer; others with nitrate of soda, sulphate of potash, lime and gypsum have been tried, as well as stable manure, and various combinations of the several fertilizers.

Our highest production was reached when gypsum was applied as well as superphosphate, but the most economical proposition was 4 cwt. of superphosphate per acre.

The information gathered from these tests has been published, and without doubt has governed the practice of farmers in the irrigation districts, as indeed it has directed us in our top-dressing practice at the Research Farm.

A new series of tests is now in progress. In these we have one plot which receives superphosphate at the rate of 6 cwt. per acre per annum, and we shall endeavour to find out if one liberal dressing of manure in the spring is as good as a number of smaller dressings.

During the last two seasons the Irrigation Investigations Committee, with representatives from the Agricultural Department and the Water Commission, has carried on tests in four districts—at Swan Hill, Rochester, Tongala, and Stanhope. In all these places the yields have been increased by the use of manures. At Swan Hill the results were remarkable. Super. in quaitities from 2 cwt. per acre to 6 cwt. per acre was tried. The heaviest dressing more than doubled the yield, raising the total for the season from 3 tons of hay per acre to 7 tons. During the growing season the lucerne on the super. top-dressed plots at Swan Rill is in marked contrast to that on the untreated plots alongside.

In all of the other country tests we have tried superphosphate in quantities up to 4 cwt. per acre, as well as superphosphate and lime, superphosphate and gypsum, superphosphate and potash, bone fertilizer, and ground rock phosphate. With the exception of ground rock phosphate and bone fertilizer, all the dressings have been profitable—the most profitable being 4 cwt. of superphosphate per annum.

I have encountered various objections to manuring lucerne. Some think that adding fertilizers to land is a confession that their land is poorer than it is reported to be. I have been told quite definitely that the Swan Hill river flats require no manure, because excellent crops were formerly grown without manure. Sheep farmers have said to me, "It may be all right for dairymen, but sheep manure the land well enough." If I were inclined to make any concession at all, I might admit that the dairyman who feeds concentrates to his cows has not the same necessity for artificial fertilizers as the sheep farmer, but my advice to all is the same whether hay growers, dairy farmers, or sheep farmers—top-dress your lucerne. The declining stands will be restored to their former productivity, for you will make good the depleted stocks of phosphoric acid in the soil which have been drawn on to make the hay grow on your farm, or which has been used to build up the bones of your sheep, cows, horses, pigs, &c., or have entered into the composition of the milk you sell.

The poultry farmer who grows a small plot of lucerne which he waters with a hose may not consider himself an irrigation farmer, but my advice to him is—apply superphosphate to your plots at the rate of 1 or 2 oz. to the square yard, and you will increase the yield. We are sometimes told by those who object to manuring that lucerne enriches the land, and they point to the fact that wonderful crops of cereals may be grown on old lucerne land. There is truth in this, and lucerne, because of its deep-rooting habit, taps the soil at greater depth than any other agricultural plant. The leaves which drop from the growing plant and from hay, and the decayed roots add humus to the soil, and there is no better means of renovating land than by putting it into lucerne for a while. All the same, if you remove crop after crop of lucerne hay, or build up the bodies of farm animals on your lucerne pasture, you are gradually and surely depleting the mineral content of the soil, and it will have the effect of reducing the production of lucerne.

At this juncture, I should like to talk of that remarkable character of lucerne, and the family of plants to which it belongs, the character which permits them to make use of the nitrogen of the atmosphere through the agency of colonies of bacteria living on their roots.

Nitrogen is the most valuable element of plant food, and lucerne has a high proportion of nitrogen in its composition. This is the reason it is such a good fodder. This is what makes the dead roots and leaves have such a high fertilizing value. If the soil be well aerated, and sweet, the colonies of bacteria in the small root-nodules are able to flourish, and the plant is well supplied with nitrates, but an over-abundance of nitrate will be of limited use if there is not enough phosphoric acid.

Thus we are brought back to the fact that the prevailing deficiency of phosphoric acid in the soils of Victoria makes it necessary for us to supply what is lacking, and let me conclude as I began, by urging you to supply this lack, in the case of lucerne lands, by liberal top-dressings of superphosphate.

THE PIG INDUSTRY.

(Continued from page 404.)

By R. T. Archer, Senior Dairy Inspector, and A. J. Gill, Senior Herd Tester.

Care of Young Pigs.

Sows with young will yield from 5 to about 6 lb. of milk per day. In tests carried out with Berkshire and Poland China sows, the former produced 6 lb. and the latter about 5 lb. of milk. Sows' milk tests

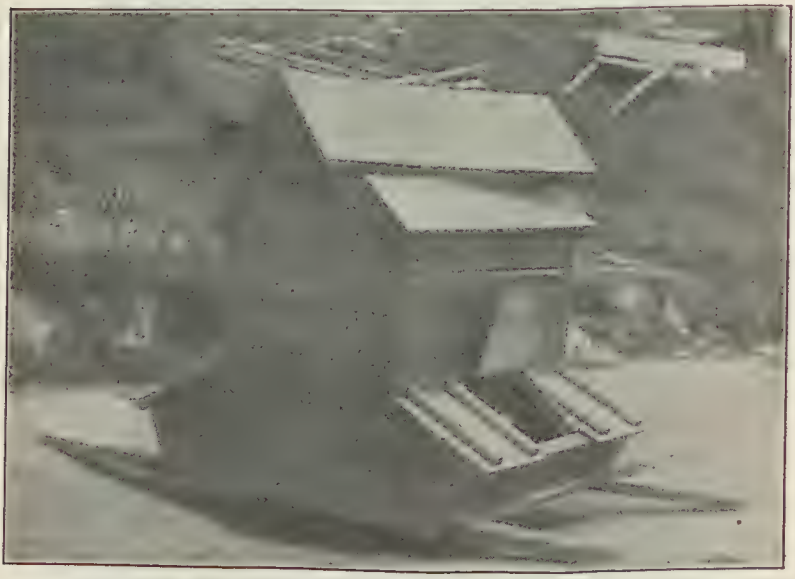
Small Self-feeder for Young Pigs in use on the Farm of Mr. Thompson, Pakenham.

much higher than that of cows, and at times contains 12 per cent. butter fat. During a suckling period a sow will probably yield about 50 gallons of milk. The maximum yield will be given when the young are from three to four weeks old. Then she commences to gradually dry off, and it is at this time the young pigs commence to look for a little extra solid food, and pig creeps should be provided for them. By pig creeps is meant small openings which will permit the young ones to reach a trough where the mother cannot disturb

them. They should be given food similar to that fed to the sow. Besides helping the young ones along, it will stop them from worrying the mother.

Tests have been made to ascertain the difference between the increase in weight made by young pigs during the day and that made during the night, and it is estimated that 71 per cent. of a young animal's gain takes place at night, and only 29 per cent. during the day. Every breeder should make it a rule to castrate the young pigs before weaning —when they are about a month old, if possible; they should certainly never be let go beyond six weeks. Delay in castration may cause the pig to become "staggy." Further, it may bring about the growth of what is known as a shield, which will sometimes mean that 30 per cent. of the sides of the adult pig will be of no use for bacon.

The best age at which to wean pigs is when they are about eight weeks old. The sow will then be able to produce two healthy litters



Self-feeder with Movable Top, made on Mr. Thompson's Farm at Pakenham.

in the year. But, under certain conditions, where there is no milk or green pasture available for the young pigs, it is advisable to allow them to run with their mother from ten to twelve weeks.

The sows' milk is of a nutritive ratio of about 1 in 2. The young pig, however, should, before weaning, have been getting a little grain daily, for after weaning time it requires food in the proportion of 1 in 4 in order to give the very best returns, and it is by feeding in correct proportions that good results are obtainable. After weaning, the young should be fed on food similar to that the sow has been getting.

Sudden changes must never be made in their food; fresh milk should not be fed one day and sour milk the next. The feed casks should be cleansed frequently, otherwise the food will become putrid and fermenting In fact, to be successful in pig-farming, reasonable clean-

liness at all times is essential. Filthy troughs and dirty food are responsible for the deaths of many young pigs.

When pigs are being given their food in troughs, they should be fed three times a day; if fed only twice a day, they become ravenous and gorge themselves, and then indigestion may cause diarrhœa and frequently death. The losses among young pigs are usually brought about by indigestion and other stomach troubles, which are almost always the result of sudden changes in diet, dirty fermented foods, and too long a period between meals. A reasonable quantity to allow a pig is what he will clean up in about twenty minutes. When feeding grain, 3 lb. to a gallon of milk will give a correctly balanced ration for pigs just weaned.

Feeding.

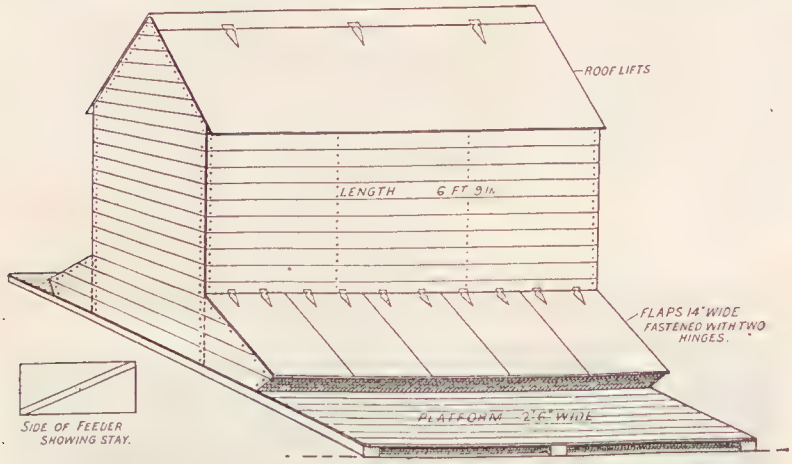
When feeding grain to pigs it should always be gristed, as it will then give better results. Whole grain should not be soaked in too much water, for this may cause scour. Three pounds of water is suffi-

Self-feeder showing Troughs and Flaps (in use at Mr. Purnell's, Moriac).

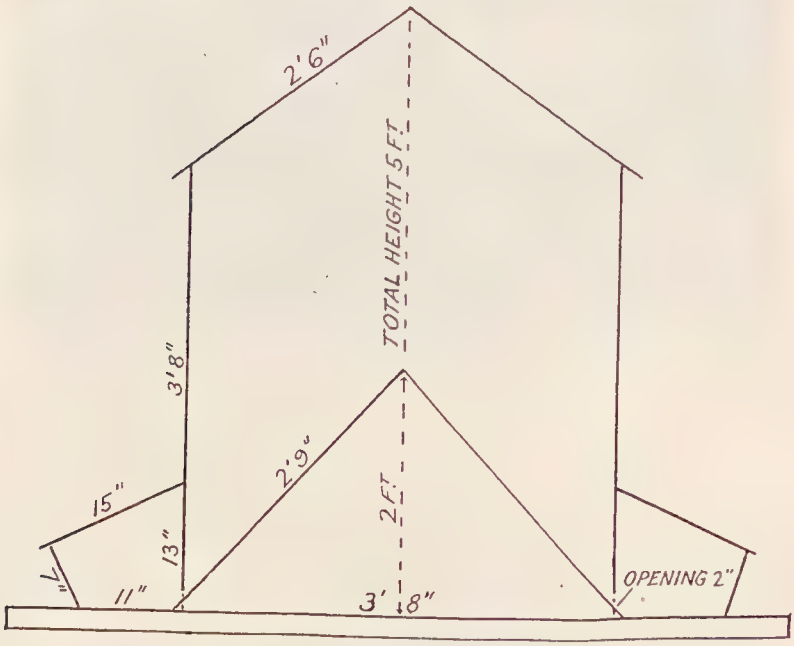
cient to soften 1 lb. of grain, and will give the correct amount of moisture. If whole grains be bolted, a certain percentage will pass through undigested; but, if they are spread out on grass and picked up slowly, they will be chewed, and a larger percentage digested.

In wet feeding, more than three parts of liquid to one of meal should never be used, otherwise the pig will swallow its food without masticating; three parts liquid to one of meal will give the correct consistency and bring about the very best results. When, as it happens sometimes in the spring, a farmer has milk in large quantities and is feeding only a small quantity of meal, care should be taken to see that the meal is fed in the correct consistency, and the extra drink of milk given afterwards. Throwing a handful of meal into 3 or 4 gallons of milk is a wasteful practice, as then the meal is swallowed without being chewed, and a proportion will pass out undigested with the excreta. These may appear trifling points, but they make the difference between success and failure.

When feeding potatoes they should be boiled; the boiling breaks up the starch granules and makes digestion easier. As far as we know at present, potatoes are the only food improved by cooking. The water



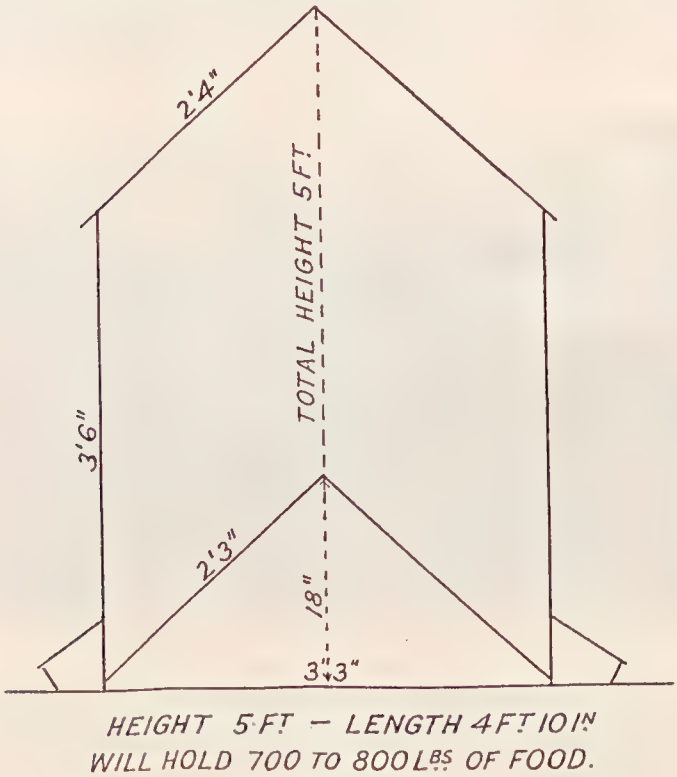
Plan of a Self-feeder capable of holding up to 1,000 lb. food.



End view of Feeder shown above.

potatoes have been boiled in should be thrown away. They should be mixed with grain and milk in the proportion of 1 lb. grain and 1 gallon milk to 3 or 4 lb. potatoes.

The methods of feeding detailed are chiefly what is termed wet feeding. Of late years a method of dry feeding has come into practice, especially where pigs are run on pasture. Though dry feed is sometimes given in troughs, what are known as automatic feeders are generally used. They are simple to make. Sometimes they are divided into compartments, different grains being placed in each section; these are called self-choice feeders. Usually, however, the practice is to mix the gristed grains; the addition of meat meal or dried milk helps to balance the ration when no liquid milk is available. One advantage of these feeders is that by their use the pigs eat slowly, taking a little at



End view of a Self-feeder capable of holding up to 800 lb. of food.

a time, and chewing it well. The dry-feeding method means a saving of labour, and tests that have been made go to show that it gives better returns. One trial with several hundred pigs proved that dry-fed pigs when ready for bacon weighed 7 lb. more than those which had consumed the same quantity of wet food.

Pigs will thrive very much better on mixed grain than if fed on one variety alone. On pasture a pig will consume about 1 lb. of grain daily for each month of its age. Experiments in the feeding with unlimited quantities (as can be done with self-feeders), and the giving of what was estimated to be a correct allowance at fixed times, proved

that the unlimited supply gave better results for a smaller outlay. Pigs kept in the open and fed through self-feeders will fatten rapidly if the pasture is of fair quality.

In the newest feeders, flaps are placed over the trough; each flap has two hinges, and is about 14 inches wide. The pigs quickly learn to lift the flaps. Some breeders have fitted flaps over ordinary troughs for dry feeding.

Running Pigs on Pasture.

In handling pigs for market, they should never be kept in large mobs; from twelve to fifteen is a suitable number, and from 1 to 2 acres makes the handiest size for paddocks when only moderate pasture is available; on abundant pasture of rye grass and clover or lucerne,

Rough Shelter with small Yard. (Note "creep" for Young Pigs.)

half an acre will be quite sufficient to fatten twelve pigs. On a farm at Bacchus Marsh, a quarter-acre of good lucerne proved ample to fatten twelve pigs that were given a small allowance of grain.

For out-door keeping, pig-proof fences must be erected. A fence of ordinary pig-netting, with a barb wire at the bottom and one at the top, and a plain wire in the middle, can be erected at a reasonable cost. There are various makes of pig-proof fences on the market; the spring-coil fence is satisfactory, providing the wire droppers are locked. A fence of four barbed wires with a plain wire on top is sometimes used.

In pasturing pigs one must take into consideration the feeding value of the pasture and balance the ration accordingly. When they are feeding on lucerne or good clover pasture, a meal mixture of the nutritive ratio of 1 to 6 would give excellent results. When running on fair grass and clover, the ratio should be 1 to 5; on rape, 1 to 4; on green oats and tares, about 1 to 4½ or 5.

Balancing the Ration.

In order to balance the ration it is necessary to know the percentage of carbohydrates (fat-forming, heating, and energy-giving elements), of fat (similar to carbohydrates, but two and a half times as valuable), and of protein (the flesh-forming portion) contained in various foods.

The nutritive ratio of foods is found in the following way:—Multiply the fat content of the food by two and a half (the reason for this is that 1 lb. fat is equal to 2½ lb. starch); to the result add the proportion of carbohydrates, and divide the total by the proportion of protein. Barley contains 9.6 per cent. protein, 2.1 per cent. fat, and 63.5 per cent. carbohydrates, and the calculation below—

$$2.1 \times 2\tfrac{1}{2} = 5.25$$
$$5.25 + 63.5 = 68.75$$
$$68.75 \div 9.6 = 7.16$$

shows that its nutritive ratio is 1 to 7.16. Hereunder, nutritive ratios of several examples of mixed rations have been worked out:—

Example I.

Food.	Quantity.	Contents.		
		Protein.	Carbohydrates.	Fat.
	lb.	%	%	%
Barley	60	9·6	63·5	2·1
Wheat	50	10·2	69·2	1·7
Linseed Meal	12	26·1	38·5	6·5
Meat Meal	10	65.0	..	6.0

Carbohydrate Ratio.

Barley	63.5 × 60 lb. ÷ 100 =	38.10
Wheat	69.2 × 50 lb. ÷ 100 =	34.60
Linseed meal	38.5 × 12 lb. ÷ 100 =	4.62
		77.32

Fat Ratio.

Barley	2.1 × 60 lb. ÷ 100 =	1.26
Wheat	1.7 × 50 lb. ÷ 100 =	.85
Linseed meal ..	6.5 × 12 lb. ÷ 100 =	.78
Meat meal	6.0 × 10 lb. ÷ 100 =	.60
	3.49 × 2½ =	8.72
		86.04

Protein Ratio.

Barley	9.6 × 60 lb. ÷ 100 =	5.76
Wheat	10.2 × 50 lb. ÷ 100 =	5.10
Linseed meal ..	26.1 × 12 lb. ÷ 100 =	3.13
Meat meal	65.0 × 10 lb. ÷ 100 =	6.50
		20.49

86.04 ÷ 20.49 = 4.19; therefore nutritive ratio may be regarded as 1 to 4.

Example II.

Food.	Quantity.	Contents.		
		Protein.	Carbohydrates.	Fat.
	lb.	%	%	%
Barley	60	9·6	63·5	2·1
Pollard	40	12·2	53·4	3·8
Peas	20	16·8	51·8	·7

Carbohydrate Ratio.

Barley .. .. 63.5 × 60 lb. ÷ 100 = 38.10
Pollard .. .. 53.4 × 40 lb. ÷ 100 = 21.36
Peas .. .. 51.8 × 20 lb. ÷ 100 = 10.36
69.82

Fat Ratio.

Barley .. .. 2.1 × 60 lb. ÷ 100 = 1.26
Pollard .. .. 3.8 × 40 lb. ÷ 100 = 1.52
Peas .. .. .7 × 20 lb. ÷ 100 = .14
2.92 × 2½ = 7.30
77.12

Protein Ratio.

Barley .. .. 9.6 × 60 lb. ÷ 100 = 5.76
Pollard .. .. 12.2 × 40 lb. ÷ 100 = 4.88
Peas .. .. 16.8 × 20 lb. ÷ 100 = 3.36
14.00

77.12 ÷ 14 = 5.5; therefore nutritive ratio may be regarded a 1 in 5½.

Example III.

Food.	Quantity.	Contents.		
		Protein.	Carbohydrates.	Fat.
	lb.	%	%	%
Barley	60	9·6	63·5	2·1
Pollard	42	12·2	53·4	3·8
Peas	20	16·8	51·8	·7
Meat Meal	12	65·0	..	6.0

By the same methods as shown in Examples I. and II. the various ratios are ascertained; they are—Fat 3.71; carbohydrates 70.88; and protein, 22.04. Then, by the following calculation:—

3.71 × 2½ = 9.27
9.27 + 70.88 = 80.15
80.15 ÷ 22.04 = 3.6

the nutritive ratio is shown to be 1 to 3.6.

Example IV.

Food.	Quantity.	Contents.		
		Protein.	Carbo-hydrates.	Fat.
	lb.	%	%	%
Maize	50	7·8	66·7	4·3
Oats	40	9·2	47·3	4·2
Pollard	40	12·2	53·4	3·8

The ratios are—Fat, 5.25; carbohydrates, 73.63; and protein, 12.46. By the following calculation:—

$$5.35 \times 2\tfrac{1}{2} = 13.37$$
$$73.63 + 13.37 = 80.00$$
$$87 \div 12.46 = 6.9$$

the nutritive ratio is shown to be 1 to 6.9.

Example V.

Food.	Quantity.	Contents.		
		Protein.	Carbo-hydrates.	Fat.
	lb.	%	%	%
Barley	100	9·6	63·5	2·1
Lucerne Chaff	30	12·3	37·1	1·6
Linseed Meal	10	26·1	38·5	6·5
Meat Meal	10	65·0	..	6·0

Nutritive ratio, 1 to 3.9.

Example VI.

Food.	Quantity.	Contents.		
		Protein.	Carbo-hydrates.	Fat.
	lb.	%	%	%
Barley	100	9·6	63·5	2.1
Rice Meal	40	11·8	48·4	13·3
Meat Meal	10	65·0	..	6·0
Linseed Meal	10	26·1	38·5	6·5

Nutritive ratio, 1 to 4.

EXAMPLE VII.

Food.	Quantity.	Contents.		
		Protein.	Carbo-hydrates.	Fat.
	lb.	%	%	%
Potatoes	4	0·9	16·3	·6
Barley Meal	1	9·6	63·5	2·1
Skim Milk	10	2·9	5·2	·3

Nutritive ratio, 1 to 4.17.

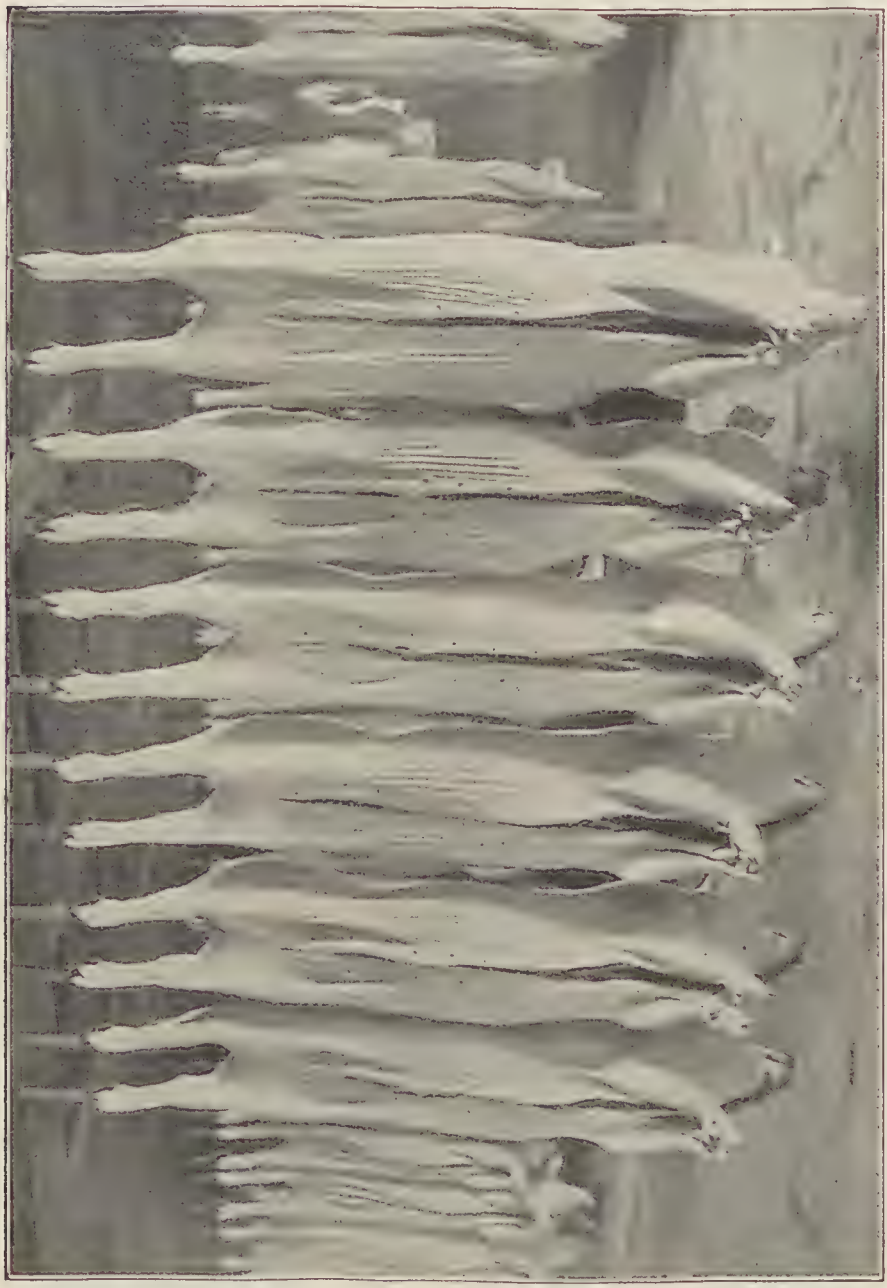
A Pig Shelter at Mr. Purnell's Farm, Moriac.

EXAMPLE VIII.

Food.	Quantity.	Contents.		
		Protein.	Carbo-hydrates.	Fat.
	lb.	%	%	%
Barley	50	9·6	63·5	2·1
Pollard	50	12·2	53·4	3·8
Millet	50	7·1	48·0	2·5

Nutritive ratio, 1 to 5.9.

The feeding of maize alone gives a soft oily bacon, and millet alone has a similar effect. Peas do not produce a first-class bacon when fed solely. Barley, wheat, oats, and pure pollard give a first-class bacon, but the ration may be improved by the addition of milk. However, as stated before, the best results are achieved by feeding mixed grains. Pigs fed largely on green lucerne up to time of killing yield a "soapy" bacon, but this may be remedied by feeding them solely on grain for



94 lb. 102 lb. 98 lb. 95 lb. 83 lb. 86 lb.

(Some of these weights are rather heavier than those required for the local market.)

Pigs for Export. (Photograph taken at Western and Murray Co-operative Bacon Coy's.)

from two or four weeks at the end of the fattening period. Those treated thus give bacon of first-class quality.

The bacon and pork from pigs fed as a test on pasture and grains up to the time of killing were reported by two different factories to be of excellent quality. This is exceedingly gratifying, because our only chance of competing in the English market is with pasture-fed pigs. Sty-rearing methods would be too expensive altogether.

Results of Two Feeding Experiments.

I.

The following is the result of a feeding experiment carried out at Mr. Thompson's Farm at Pakenham during August and September, 1925:—

Fifteen pigs twelve weeks old were placed in a 2-acre allotment of fair pasture. They were fed a mixture of maize and barley in equal parts, with a little dried milk. Maize was suggested for a trial by a leading bacon-factory manager, who was anxious to find out if making it 50 per cent. of the ration would have any detrimental effect on the quality of the pork.

The first weighing took place on 10th August, when the average weight was $51\frac{2}{3}$ lb. and the total live weight 775 lb. The average live weight after 47 days was $96\frac{2}{3}$ lb., which means that their average dressed weight was $61\frac{13}{15}$ lb. Their total weight was 1,449 lb., and their dressed weight 928 lb. The factory manager reported that the pork was first class, and it was paid for at the rate of 10d. per lb. The cost of rearing in feeding the pigs was—

	£ s. d.	£ s. d.
Value of fifteen pigs when experiment commenced—15s. each		11 5 0
Value of grazing—3d. per pig per week		1 6 3
Food purchased—		
Maize—1,144 lb., at 6s. per bushel	6 2 6	
Barley—1,144 lb. at 4s. per bushel	4 11 6½	
Dried milk—173 lb., at 3½d. per lb.	2 10 5½	
		13 4 6
		£25 15 9
Pork—928 lb., at 10d. per lb.		38 13 4
Profit		£12 17 7

The number of days the pigs were fed was 47.
The area given up to them was 2 acres.
Cost of food was approximately 1.3d. per lb.
Each pig ate an average of 3.49 lb. per day.
3.65 lb. food produced 1 lb. pork.
Each pig gained an average of .956 lb. per day.

II.

An interesting feeding experiment was this year carried out on Mr. C. Edwards's Farm at Bacchus Marsh. Ten Middle Yorkshire pigs, fourteen weeks old, were placed in a small paddock of lucerne about ¼ acre in size; the lucerne was about 12 inches high. The total weight of the pigs at the beginning of the test (30th December, 1925) was 629 lbs., an average of 62.9 lb. per head. They had access to an automatic feeder, which contained a mixture of barley, rice-meal, and malt

combings, and were allowed to consume as much as they wanted. Skim milk was supplied twice daily.

On 29th January their total weight was 955 lb., an average of 95.5 per head. The total gain for the period was 326 lb., averaging 32.6 lb. per pig.

In addition to the lucerne, food as follows was consumed:—

Food.	Quantity.	Contents.		
		Protein.	Fat.	Carbo-hydrates.
	lbs.	%	%	%
Barley	380	37·080	7·980	241·30
Rice Meal	190	22·420	25·200	91·196
Malt Combings	44	6·556	3·476	22·79
Skim Milk..	1,500	43·500	·450	78·00
	2,114	109.556	37.106	434.05

37.106 × 2½ = 92.765
92.765 + 433.69 = 526.455
526.455 ÷ 109.456 = 4.8
Nutritive ratio, 1 to 4.8.

Cost of Food.

Barley, 380 lb., at 3s. 5d. per bushel	1	6	0
Rice meal, 190 lb., at £9 10s. per ton	0	18	0
Malt combings, 44 lb., at £5 10s. per ton ..	0	2	5
Skim milk, 150 gallons, at 2d. per gallon ..	1	5	0
Total cost	£3	11	5

Average amount of mixed food (exclusive of grass) consumed daily by each pig—2.046 lb.

Average amount of skim milk consumed daily by each pig—5 lb.

Average daily gain—1.08 lb. per pig.

LATE POTATO FIELD CROP COMPETITION.*

Conducted by the Romsey and West Bourke Agricultural Society.

Report by the Judge, J. T. Ramsay, Potato Expert.

The standard of cultivation of the crops entered for the competition throughout was good. Yields were moderate on account of the dryness of the season during the middle of the growing period. The quality on the average was very good, and the crops were practically free from disease.

In the crops entered improvement could have been made in some cases, as can be seen from the figures, both in the distance between the rows and the distance between the sets in the row. Under no circumstances should rows be wider than 27 inches apart, which is equal to 29 rows to the chain.

* For report on Early Crop Competition, see this *Journal* for May, 1926.

During the past twelve years I have judged many field crop competitions throughout the State, and I have found it to be the rule that with close planting between the rows, say, 26-27 inches, and close planting between the sets in the row, say, 13-14 inches for Early Carmen, and 15 to 16 inches for late varieties like Carmen 3 and Snowflakes, not only was the weight of the crop improved, but there was also considerable improvement in the quality of the tubers. The desirableness of close planting applies to all classes of soil.

Results.

Name of Grower.	Evenness.	Cleanness.	Quality	Rows per Chain.	Weight per Chain.		Acre. Tonnage.	Points for Weight.	Total Points
					Large.	Small.			
Possible Points ..	**10**	**10**	**35**	..	..	..	..	**45**	**100**
					lb.	lb.	t. c. q.		
G. Duncan	8	8	33	29	54	3	7 0 0	45	94
W. McKinley	10	10	31	29	44	6	5 14 0	37	88
T. A. Parks	8	9	33	29	42	6	5 8 3	36	86
P. J. Sheehan	8	8	32	29	41	2	5 6 0	35	83
A. R. Wilson	8	8	32	30	38	4	5 1 3	33	81
A. Vinnicombe	7	9	33	28	38	3	4 15 0	31	80
F. A. Newnham	8	9	34	29	33	4	4 5 0	28	79
Spring Brothers	9	9	32	30	30	5	4 0 3	26	76
N. B. Alston	9	9	32	27	28	2	3 7 2	22	72
W. R. Sullivan	8	8	30	28	30	5	3 15 0	24	72
J. Ryan	9	9	30	29	19	7	2 9 0	16	64
J. Doyle	7	8	31	28	19	5	2 7 2	15	61
B. Scanlan	9	9	30	24	19	8	2 0 2	13	61

In allotting points for weight, the possible, namely 45, was given to the heaviest crop, and to the others pro rata.

COLERAINE POTATO CROP COMPETITION.

Conducted by the Coleraine Agricultural Society.

Report by Judge, J. T. Ramsay, Potato Expert.

As will be seen from the points allotted to the various crops entered for this competition for "evenness of crop," which includes purity of the stocks entered, and from the points allotted for "cleanness of crop," which means cleanness of cultivation and freedom from disease, the standard of cultivation throughout was high. In the quality of the crops, however, there was a wide range in the points gained, though the majority were good.

The average weight of the crops, which was 5 tons 4 cwt. 3 qrs., was high for this season, considering the dryness of the weather during a critical portion of the growing period. The three leading crops were of exceptional weight for such a year, and contributed largely to the high average.

Considerable improvement could be made, however, by the bulk of the competitors in the matter of the spacing of the sets, both between the rows and in the rows. In the majority of cases the spacings were altogether too wide. An ideal spacing between the drills is 26 to 27 inches, which equals 30 and 29 drills to the chain respectively.

The spacing between the sets in the row, in the case of late varieties such as Carmen No. 3, or Snowflake, should be 15 or 16 inches, and in

the case of early varieties, such as Carmen No. 1 and Manistee, the spacing should not be wider than 13 or 14 inches between the sets in the row.

Wide spacing of the crop tends to produce, especially in a favorable season, a run of tubers which are altogether too large, and therefore of low table quality. During the past two years, the Ministry for Agriculture in the North of Ireland has conducted tests in the spacing of the potato crop, results of which have just come to hand. The standard width between drills adopted in these tests was 27 inches, equal to 29 rows per chain. The spacings given were 10 inches, 15 inches, and 20 inches between the sets, respectively. The tests were conducted over two years with half-a-dozen varieties in all. The results obtained showed in every case an increased tonnage per acre in favour of the 10 inches spacing, which came first, 15 inches being next, and 20 inches being last.

In the report of the official observers, stress is laid on the fact that not only was the heaviest yield obtained from the 10 inches spacing, but a marked improvement in the quality of the tubers was noticeable in the crop from the sets spaced at that distance apart, compared with the wider spacings of 15 and 20 inches.*

Another point on which I would like to remark is that in every case where heavy yields were obtained in this competition, these were evidently the result of manure having been used. This suggests that much improvement could be made to the crops of the district by judicious manuring. Exactly what rate of manure per acre would produce the maximum result is a matter for experiment, and I would recommend that the society should conduct manure trials on this crop with a view to determining exactly what manure and what rate per acre would produce the best return. I have no doubt that if application were made to the Department for these trials to be officially supervised, the request would be granted.

The Coleraine Agricultural Society is to be congratulated on its enterprise in conducting this competition, which cannot but stimulate better farming practices in the district.

FIELD CROP COMPETITION FOR POTATOES, 1925-26.

Grower.	Variety.	Evenness.	Cleanness.	Quality	Rows per Chain.	Weight per Chain.		Acre Tonnage.	Points for Weight.	Total Points.
						Large.	Small.			
Possible Points	.. ..	10	10	35	..	..	..	.. ..	45	100
						lb.	lb.	T. C. Q.		
A. Bickley, jun.	Carman 3	9	9	34	21	98	3	9 0 3	43	95
A. G. Turnbull	Snowflake	9	9	30	22	96	4	9 8 2	45	93
A. Bickley, sen.	Carman 3	9	9	33	21	90	3	8 8 3	40	91
A. G. Turnbull	Snowflake	9	9	31	22	71	3	6 18 2	33	82
F. J. Fitzgerald	Snowflake	9	9	32	32	33	1	4 14 0	22	72
B. Lyon ..	Carman 3	8	9	32	30	27	8	3 12 1	17	66
C. Brown ..	Carman 1	8	9	35	24	26	2	2 15 3	13	65
A. Taylor ..	Snowflake	9	9	29	29	24	4	3 2 0	16	63
B. Lyon ..	Carman 3	9	9	31	31	18	12	2 10 0	12	61
A. Frischoff ..	Snowflake	7	7	25	30	14	4	1 17 2	9	48
G. Harris E. Wright W. Burchell	Entries Withdrawn									

The average tonnage per acre of the entries judged works out at 5 tons 4 cwt. 3 qrs.

* For full account of experiments and results see this *Journal* for May, 1926.

MINYIP CROP AND FALLOW COMPETITION, 1925.

Report of the Judge, J. Brake, B.Agr.Sc., Senior Inspector of Agriculture.

Prosperity—that is the keynote of business in the Minyip district to-day. Fifty years ago the township did not exist; it was about that time that farmers first settled in the district, and began to eke out a precarious livelihood from the cultivation of wheat.

Hardships of Early Settlement.

These hardy pioneers were confronted with tremendous difficulties, knowing only the deep cultivation methods of the southern districts, and growing crop on crop, year after year, their yields amounted to a few bushels per acre. They were faced with droughts, with only the deep wells and station dams to carry them through, and what wheat they did manage to grow could not be disposed of nearer than Stawell, which was distant nearly 50 miles.

With the pushing through of the domestic water supply scheme, and the extending of the railway first to Murtoa and later to Minyip and Warracknabeal, the lot of the wheat-farmer became somewhat easier. It was not, however, until the practice of bare fallowing and the use of superphosphate were introduced at the beginning of this century that yields began to increase to any extent.

Science Helps to Solve the Problems.

At that time the average yield in the Wimmera was 7 bushels per acre, but six years later it was almost doubled; a steady advance of the yield was maintained, first by the extension and improvements in fallowing, and, secondly, by the production of Federation wheat.

In the next few years, up till 1920, methods of cultivation improved year by year, and the work of the Department of Agriculture, in co-operation with the more progressive men of the district, resulted in the more liberal use of seed and superphosphate, the introduction of summer fallowing and late sowing, and the practice of more and more intensive cultivation. To-day the Wimmera district leads the State in method and efficiency in wheat-growing, and the average yield per acre has risen to 22.5 bushels, or 5 bushels more than last year's record average of 17.5 for the whole of Victoria.

Minyip has many Efficient Farmers.

Minyip lies near the centre of the black soils area known as the Wimmera Plains, and has established itself as one of the most reliable wheat-growing districts in Australia. The soils are uniform, and consequently the best method of their preparation for the crop has become well understood. Very briefly, this consists of early and thorough fallowing, the formation and retaining of a loose surface mulch about 2½ inches deep, and the building up of a firm, moist, seed-bed beneath the mulch.

Owing to the high content of lime in the black plains, the fining down of the surface layer can be accomplished without any danger of the soil running together and setting hard, a condition which would certainly be the result in the case of the stiff red soils of the Wimmera, or of the yellow clays of the Goulburn Valley.

The success attending the testing of these well defined rules of cultivation over the last ten years, and perhaps particularly so over the dry season just past, has inspired the local farmers with a confidence in their district which leads them to believe that it would require an extraordinarily bad run of seasons indeed to cause crop failures on really well prepared fallows.

Methods can Always be Bettered: Strive to Excel.

Notwithstanding the success achieved to date, however, it would be foolish to imagine that methods cannot be further improved. As a matter of fact, although the yields this year throughout the Minyip district were uniformly good, many of the crops promising 9 to 10 bags, no 45 to 50 bushel crops were heard of, whilst at least two other districts each had a crop yielding 16 bags.

In an examination of the methods adopted by the contestants in the crop competition, we notice that the plough was not used at all

A Farm Home—Evidence of District Prosperity.

on two of the leading exhibits, the whole of the preparation of the soil having been done with the scarifier and the harrows.

Six out of seven of the crops were on summer fallow, and the winter fallow crop was bushels in yield behind all but one of the others.

The average number of workings given before harvest was seven, of which three were harrowings, and after harvest five, including three harrowings. All the crops were sown between the 7th and the 30th June.

Copper carbonate pickle was tried by one competitor; the others used formalin.

The quantity of seed sown per acre varied from 70 to 90 lb., whilst the amount of superphosphate applied averaged 114 lb. per acre. In view of the fact that, at Longerenong, 140 lb. of super. per acre is used on all the bulk fields, it is considered that the most profitable dressing for first class fallows at Minyip should be considerably above the hundredweight.

Awards.

Crop, on fallow, judged last year—not less than 100 acres.

Competitor.	Apparent Yield.	Trueness to type.	Absence of Weeds.	Absence of Disease.	Evenness.	Total.
Possible Points	**35**	**20**	**15**	**15**	**15**	**100**
McGilp, A. D.	27	16	14	14	13	84
Niewand, E.	27	16	13	13.5	13	82.5
Krelle, E. E.	26	18	11	14	12	81
Krelle, A.	23	16	13	14	15	81
Huf, V.	26.5	16	10	13.5	13	79

Mr. E. E. Krelle's Crop.

Mr. A. D. McGilp's winning crop of Federation was sown at the rate of 85 lb. with 112 lb. of super. per acre. The seed had been pickled in formalin. The soil was of high quality, and had been well prepared for the crop. Mr. McGilp did not use the plough on the paddock, but scarified it in April, and again in July. It was then twice harrowed, scarified in the latter part of August, harrowed in September, scarified in October, and harrowed in November. After harvest, a harrowing was given in February, and again in April, and a final scarifying in May. The paddock was then sown with the "combine" on the 20th June, and harrowed.

As the points allotted indicate, the crop was good all round. It was sown with 3½-inch spacings between rows. Mr. McGilp is of the opinion that this method of sowing assists materially in the suppression of weeds.

The second prize crop of Mr. E. Niewand was disc-plowed in April, and scarified four times before harvest; it was then harrowed after the rain on the 11th May, scarified and "combined" in on the 7th June with 80 lb. of "Federation" and 93 lb. of superphosphate per acre. It was also a uniformly good crop, but had a sprinkling of wild oats, and a little more disease was noticed in it that in the winning exhibit.

Mr. E. E. Krelle's crop was grown on well worked fallow—scarified April; scarified July; harrowed, scarified August; harrowed, scarified October; scarified November; harrowed in January, in February, and again in March; scarified June, then "combined" in on the 30th June with 90 lb. "Federation" and 90 lb. superphosphate per acre. Unfortunately, however, about 20 acres was badly attacked with mustard, and would pull the average yield down considerably. Points were also lost on account of the fairly numerous strips of missed land.

Name of Competitor.	Apparent Yield.	Trueness to Type.	Absence of Weeds.	Absence of Disease.	Evenness.	Total.
Possible points	**35**	**20**	**15**	**15**	**15**	**100**
OPEN CROP—75 ACRES.						
Niewand, E.	27	16	14	14	14	85
Krelle, E. E.	27	18	13	14	12	84
McGilp, A. D.	27	16	14	14	13	84
Krelle, A.	23	16	13	14	15	81
Westerland, S.	30	17	10	11	12	80
Huf, V.	27	16	10	13·5	13	79·5
Murphy, J.	22	17	13	13	10	75
OPEN CROP—80 ACRES OF HUF'S IMPERIAL WHEAT.						
Huf, V.	25	16	10	14	13	78

In the 75 acres of open crop section, the first three places were filled by crops of almost equal merit. Mr. Niewand carried off first prize by 1 point on the score of better drilling. The ground for his crop had received the same workings as his exhibit in the crop on fallow section, but was cleaner of wild oats and there were less missed strips. Further, the 75-acre paddock was sown a week later with 100 lb. of seed per acre and 137 lb. of superphosphate.

Mr. Krelle's crop was well above the average in trueness to type.

OPEN CROP—80 ACRES HUF'S IMPERIAL.

There was only one entrant for this section—Mr. V. Huf, who exhibited a very fair crop. It lost points, however, because of weeds and drilling.

The Fallows.

Nine entries were received for the 100 acres of fallow section, and eight for the 100 acres fallow (to be cropped and judged in 1926, and prize awarded to highest aggregate). The same fallows were exhibited for both sections.

Ninety-five points out of 100 scored first place for Mr. W. Morris, Mr. A. D. McGilp taking second with half a point less, whilst Mr. A. Krelle was third with 92.5 points.

The excellence of the fallows generally is indicated by the high awards of points, and further the uniformity of excellence, as with the crops, in the small margin separating first and last places.

The winning fallow was very well stocked with moisture, and scored full points in that regard; it lost points, however, for mulch, which was considered to be on the shallow side.

Mr. A. D. McGilp's second prize fallow was better as regards mulch, but did not show so much moisture, although it, too, was very well supplied.

Awards.

100 acres of fallow and 100 acres aggregate of fallow and crop on that fallow.

Competitor.	Mulch.	Moisture.	Absence of Weeds.	Cultivation.	Total.
Possible points	**25**	**25**	**25**	**25**	**100**
Morris, W.	22	25	24	24	95
McGilp, A. D.	23	23.5	24	24	94.5
Krelle, A.	23	23.5	24	22	92.5
Krelle, E. E.	23	22	24	23	92
Westerland, J.	23	23	22	24	92
Niewand, E.	23	22	23	23	91
Murphy, J.	23	23	22	23	91
Huf, V.	23	22	22	23	90
* Westerland, S.	22	24	22	22	90

* Mr. S. Westerland's fallow was entered for only one section, viz., 100 acres Fallow.

WHAT THE SHEEP GIVES US.

Sheep are peculiarly adapted to the preparation of pharmaceuticals, especially in the case of the thyroid.

Thyroid extract is used as a specific medicine in diseases that are due to a deficiency of thyroid secretion. Preparations, made from the glands located just above the kidneys, are used internally, and from this substance is produced a powerful astringent and heart stimulant called suprarenalin. Glands from 135,000 sheep are needed to produce 1 lb. of extract. Pituitary products, obtained from a gland located at the base of the brain, are also used to correct certain derangements in the metabolism of children.

Lanolin is an oil that is made from the sheep's fleece. Still another by-product from the pelts is the glue, which is made from the trimmings. Practically all the chamois skins in trade come from the skins after the wool has been pulled, while the leather made from sheep skins is used for drumheads, book-binding, gloves, shoes, and slippers, and various other uses requiring a soft pliable leather. After the pelts, the principal by-products from sheep are the fats and greases obtained in dressing the animal. These are manufactured into soap, glycerine, and various commercial greases. The intestines are used for the manufacture of sausage casings, musical strings, surgical ligatures, tennis strings, belt lacings, and the like.

The bones and horns are used for knife handles and other ornaments, and for the manufacture of bone meal, which is used both as an animal feed and as a fertilizer. The remaining scraps of the animal are reduced to meat meal, while the blood is used for the manufacture of blood meal for stock feeding.

—*Live Stock Journal.*

NATIVE INSECT PESTS OF THE ORCHARD AND GARDEN.

(Continued from page 431).

By C. French, Jun., Entomologist, and G. T. Levick, B. Ag. Sc., Science Field Officer.

4. The Lesser Case Moth (*Clania ignoblis*, Walk).

This case moth has an extensive range of food plants. Naturally occurring on the various native Australian trees and shrubs, it occasionally appears in great numbers in the orchard, and may do considerable damage to all trees there.

Conifers are also attacked by these insects, and it is recorded that they have destroyed Cupressus hedges in the vicinity of Melbourne.

Life-History.

The life history of this case moth is very similar to that of Huebner's case moth, already described. It, however, favours sticks rather than leaves for the outer covering of its case, and, as the illustration shows, the sticks are rather large in proportion to the size of the case, and there are generally one or two sticks, longer than the rest, projecting a considerable distance beyond the case proper.

5. The Orange Case Moth (*Oiketicus* (*Metura*) *elongata*, Saunders).

This case moth is very similar to the Lesser case moth except that the case is much larger, that of the female being from 5 to 6 inches in length. The sticks of which it is composed, however, are comparatively smaller and more sparsely distributed over the case than the sticks on the case of Clania.

The orange case moth also has a wide range of host plants. From such native trees as eucalypts and acacias, it has become a pest of citrus and orchard trees, apples, quinces, plums, vines, and many other plants; in fact, few trees and shrubs are safe from its attack. In the garden the larvae may be often found on roses, creepers, &c., while pine plantations are sometimes considerably damaged by the depredations of these pests.

Life History.

Similar to that of previous case moths described.

Control.

In gardens hand picking is sometimes sufficient to keep them in check, but, where they appear in large numbers, a spraying with arsenate of lead (1 lb. of paste in 25 gallons of water) is necessary.

In orchards the codlin moth sprays are generally quite sufficient to keep the case moths from becoming a serious pest.

All the case moths are, fortunately, subject to parasitism by various dipterous and hymenopterous parasites.

6. Cut Worm Moths (*Fam. Noctuidae*).

These moths belong to various genera—*Mamestra, Agrotis, Chlorida* and others. Though the larvae probably do more damage to field crops, they are often a serious pest in both vegetable and flower gardens, and it is recorded that in 1914 they attacked apples at Doncaster. Most

[Reproduced from French's Handbook of the Destructive Insects of Victoria, Part IV.]

Plate IV.—The Lesser Case Moth (*Clania ignoblis* Walk).

PLATE IV.

The Lesser Case Moth (*Clania ignoblis*, Walk).

Fig. I.—Case of female showing young larvae emerging. Natural size.

Fig. Ia.—Pupa in opened case, female. Natural size.

Fig. II.—Case of male, showing pupa case or skin from which perfect insect (male) has emerged. Natural size.

Fig. III.—Pupa, and perfect insect, female. Natural size.

Fig. IV.—Perfect insect, male. Natural size.

Fig. V.—Larva, female. Natural size.

Figs. VI.-VIII.—Dipterous flies, parasitic on larvae and pupae. Natural size.

Figs. IX.-XIII.—Hymenopterous parasites on larvae and pupae of entometa. Natural size.

10235.—2

Plate II.—Cut Worm Moths.

EXPLANATION OF PLATE.

Fig.
I. *Chloridea obsoleta.* (Tomato Moth.)
II. *Cirphis unipuncta.*
III. *Euxoa radians.*
IV. *Persectania evengi.* (Climbing Cut Worm.)
V. *Plusia argentifera.* (Silvery Moth.)
VI. *Agrotis spina.* (Bugong Moth.)
VII. *Eurlexia nigerrima.*
VI.I. Larva of *Agrotis.*
VIIII. Larva curled up.
X. Pupa of *Agrotis.*

(Natural size.)

vegetables are liable to damage from them, the cut-worms eating the stems, foliage, and fruit. Tomatoes frequently suffer severely from these worms, while potatoes are one of their favourite foods. In the case of field crops, the cut-worms sometimes appear in enormous numbers, practically covering the surface of the ground, leaving behind them a scene of devastation only equalled by the passing of a swarm of locusts. At other times, however, a great deal of damage is done to crops with few signs of the insect that causes it. Most cut-worms hide in the soil at the root of the plant, creeping up at night and biting off the ripening grain; other species feed during the day. About five years ago an oat crop at the Dookie Agricultural College yielded about 10 bushels per acre less than estimated owing to these insects.

Life History.

The female moths fly about at dusk, and lay their eggs either on or in the proximity of the vegetation designed as food for the young caterpillar or cut-worm.

The young caterpillars, on hatching, begin feeding immediately, but in the daytime they generally retreat under the soil or under rubbish on the ground, and come out to feed at night.

These caterpillars, or cut-worms (also known as "Army worms" and "Take-all grubs") vary in colour according to the species, being generally brown to a light greenish-grey in colour, with darker longitudinal markings. When full grown, they measure about 1¼ inches in length, and pupate just beneath the surface of the ground.

The adults are all very similar in shape and size, and are of rather stout build and about 1¾ inches across the wings. The colour varies according to species, but is generally brown to light-grey, the hind wings being, as a rule, several shades lighter than the fore wings, which usually have indistinct markings.

Control.

In the garden, the cut-worms may be poisoned either by spraying the plants with arsenate of lead or by laying baits, which the cut-worms take very readily. The baits are made by one of the following methods:—

(*a*) Any available greenstuff as lucerne, lettuce, cabbage, turnip-tops or any other succulent growth is cut into small pieces, and dipped into a solution of arsenate of lead, which may be sweetened with a little treacle or sugar.

(*b*) 1 lb. of arsenate of calcium is mixed with 9 lb. of bran, and made into a stiff mash with a little treacle and water.

If these baits be spread round affected plants in the evening, they will be very effective in keeping down the pests. Slugs and snails also take the baits readily, so they are of double value.

For invasions of Army worms into field crops, the digging of steep-sided trenches and the spraying of the edges of the crops with arsenate of lead seem to be the most practicable methods.

Many natural enemies keep the cut-worms in check in normal seasons. Of these, birds as magpies, kookaburras, ibis, and ground-larks account for large numbers, while various wasps, beetles and dipterous parasites are numerous. When a plague of cut-worms occurs, a bacterial disease frequently breaks out which entirely destroys them over large areas.

(*To be continued.*)

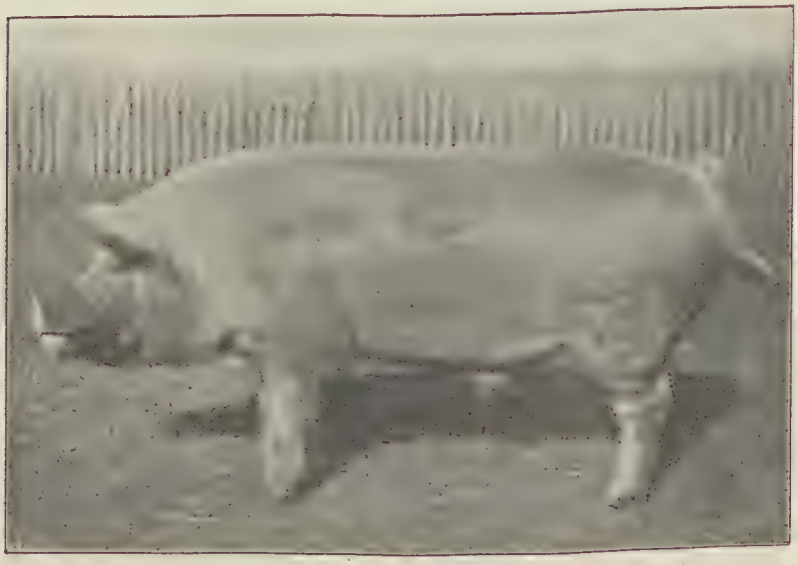
PROFITABLE FARMING.

A BOISDALE FARM.

By A. J. Gill, Senior Herd Tester, Department of Agriculture.

There is a great difference in the way dairy farmers, even in the same district, manage their farms, and too often one meets that class who have no method at all. Though in the winter they may be out getting in their cows before daylight, somehow the evening milking has to be done in the light of a hurricane lamp, and most of the day they spend pottering round—working but making no headway.

This is usually the class of farmer who tells you that dairying does not pay, and as far as they are concerned it does not, because they are muddlers. It never dawns on them that by working methodically they would get twice as much done, and that if they had a good night's rest



Gladsville Prince. (18 months old.)
3 feet high and measures 5 feet 8 inches from between the ears to butt of tail.

they could do as much work in two hours as they now do in three. Worn-out and peevish, this sort of farmer keeps the whole family miserable, and finally succeeds in driving his sons and daughters from the farm, as soon as they are old enough to leave, with an intense dislike of anything connected with dairy farming, associating it with long hours of drudgery performed under the hardest conditions for nothing more than a mere subsistence.

Then there is the farmer who has his work carefully planned. Cows are milked, the separating finished, calves and pigs fed, and all the day's work finished before dark. The stock are all in good condition; there are ample supplies of fodder on hand, and a general air of happiness, contentment, and prosperity pervades the farm.

The Dairy Herd.

To this latter class belongs Mr. Trevor Harvey, of Boisdale. It is always a pleasure to visit this farm, where everything seems to work like a piece of well-oiled machinery. There is no bustling, yet the work is always finished to time and done well. Though 60 acres are under cultivation, and about twenty cows milked throughout the year, Mr. Harvey has always time to show a visitor round the farm. His methods are well worth studying, for besides being an object lesson in systematic working, it would be hard to find in any part of the State a farm giving better financial returns.

About thirteen years ago Mr. Harvey acquired his present block, then in an unimproved state. Two things he decided on as being necessary for success—first of all, good cows, and secondly, ample food supplies for them, for he recognized that if cows were to yield well

Handsome Boy V. of Melrose, sire of several good producers.
(Son of the famous Pretty Noble.)

they must be properly fed. He had just made a start when the 1914 drought occurred. A few acres of maize had been sown, and Mr. Harvey decided to turn this into silage, for it seemed to him that this was his only hope of saving his stock during the winter. With characteristic energy he set about erecting the necessary building, and in a few weeks a 70-ton silo was completed and filled. He was thus able to keep the stock alive till rain came, so it can be truly said that the silo was the means of saving Mr. Harvey hundreds of pounds. Since then it has been filled each year, sufficient maize being obtained from 5 to 6 acres to do this.

About 15 acres of the farm, under grasses and clover, is reserved for pasture for the cows. Green oats and Japanese millet provide succulent

fodder for the greater part of the year. Maize is grown for grain which is fed to the pigs. Mr. Harvey proudly claims that cream is the only produce that does not walk off his farm.

Some little time after he bought his Boisdale property, a departmental officer advised Mr. Harvey to secure a pure-bred bull from a tested cow of a proved producing strain. Acting on the advice, Venture's Hero, son of Wilful Venture, was purchased from Mr. Keam, of Heidelberg. As the results obtained from grade Jerseys were so good, he decided to go further and obtain some pure-bred heifers, and three were purchased. As they calved they were entered in the Government herd test, and a start made to build up a carefully tested herd.

Other good females were bought as the opportunity offered, and a bull, Emperor 964, was obtained from Mr Woodmason's famous herd. Emperor was sired by Handsome Boy III., of Melrose, and it is worth noting that in 1923 he was recorded as the winner of the Jersey Herd Sires Memorial for bulls whose daughters (not less than five in number) showed the best average production under the Government Herd Testing Scheme.

1. Gladsville Baroness 2. Gladsville Princess.
(Note pig-proof fencing made from pickets and fencing wire.)

A little over twelve months ago Handsome Boy V., one of the last of the well-known Pretty Noble's sons, was secured. Though he is thirteen years of age, he has not yet passed his period of usefulness as a sire, and he is being used on the progeny of Emperor of Melrose.

By testing and culling, and by the use of good sires, a remarkably fine herd was built up in a few years, and the winning herd in the 1916 Government herd test was owned by Mr. Harvey. Their average production of butter fat during the nine months of the test was 471 lb. This year one cow has reached the 600-lb. standard, and others have yielded 500 lb.

Needless to say, under these conditions dairy farming pays. The high average quantity of production more than compensates for the low

price of butter fat. Mr. Harvey's success is an emphatic answer to those who contend that the testing of a small herd is not worth the expense. Indeed, the most successful herds in the State have built up from small beginnings, and herds improved steadily from cows, whose value has been proved, produce the animals the individual farmer requires, and which are of incalculable value to the State. Mr. Harvey's success also illustrates the value of the Government herd test, which is undoubtedly one of the best investments ever made with Government money.

How a Good Sire Improves a Herd.

The following figures show the improvement brought about in four cases by the use of a good sire:—

Name.	Yield of butter fat in nine months. lb.
1. G. Dam Queen Spark	295
2. Dam Sparkle	379
3. Sparkle II.	426

Improvement in two generations, 131 lb.

1. G. Dam Lady Marge III. ..	334
2. Dam Lady Marge IV.	396
3. Lady Marge of Jerseyholm ..	505

Improvement in two generations, 171 lb.

1. Dam Daisy V.	297
2. Daisy VI.	419

Improvement in one generation, 122 lb.

1. Empress II.	502
2. Empress of Jerseyholm	596

Improvement in one generation, 94 lb.

Pig Farming an Adjunct to Dairying.

Mr. Harvey has also turned his attention to pigs in order that separated milk and maize might be used to the best advantage. At first stores were purchased in the open market, but this method proving unsatisfactory, it was decided to breed pigs on the farm. A pure Berkshire boar and several sows were secured, and for some time Berkshires were bred and fattened. Later Mr. Harvey heard an official of the Department of Agriculture speak of Large Yorks, and he resolved to try them. First, a boar—the progeny of a brother and sister—was purchased from Mr. J. D. Read, Springhurst. This boar was crossed with

Berkshire sows, and their progeny have been remarkable for their rapid growth. Baconers of this cross are ready for market from six weeks to two months earlier than the pure-bred Berkshires. One lot, portion of which was farrowed on the 21st March, 1921, and the rest about a week later, were ready for market on the 17th August of the same year. The dressed weights of the fourteen varied from 114 to 175 lb. They realized a total sum of £108 5s. 7d., the price that year being high. The average price obtained by Mr. Harvey for baconers sold from the place during 1924 was £3 19s. 6d. Thus, assuming two litters of eight each in a year, the annual return from one sow would be £63 12s., or, if there were but one litter, the gross return could be set down at £31 16s. per sow.

The bulk of the food fed to pigs at Mr. Harvey's is pasture, maize, and skim milk, but a little pollard is also given them. The area set apart for the pigs is 7 acres, and up to 150 have been on hand at the one time. The dry sows live on pasture till close to farrowing, except

Two young Large White Sows.
(At 12 weeks one weighed 107 lb. and the other 108 lb.)

those that show signs of losing condition; these are given maize and skim milk. Young boars intended for bacon are castrated at eight weeks. The litters are usually weaned at ten weeks.

Realizing that as the superiority of the Large York became known there would be a demand for young boars, Mr. Harvey set about building up a pure-bred herd of Large Yorks. He has now seven sows, one of which was placed first in her class at the Royal Agricultural Show last year. The boar is Gladesville Prince, a good type of boar, showing good length and depth, and though only eighteen months is 3 feet in height.

Stock are being brought over from New Zealand, and, when possible, Mr. Harvey intends to obtain some of the best English strains,

and so build up one of the leading herds in Australasia. Up to date the demand for young boars is exceeding the supply.

Reporting on two pure-bred Large York baconers sent to the Dandenong Bacon Factory some time ago, the factory manager said:—

". . . This is a fine pig for bacon-curing purposes. This pig does not carry excessive shoulder, and is all that can be desired from the ham and bacon stand-point. The weights are:—Ham, 18½ lb.; middle, 23¼ lb.; shoulder, 16 lb.; head, 4 lb."

These weights probably supply the reason why the Large York is favoured so much in other parts of the world. In addition, it must be remembered that he is a very fast growing pig, and always shows a good proportion of lean meat.

Two young boars sold recently from this farm at four months weighed 151 and 159 lb. live weight. Two young sows undergoing a feeding test for the Department weighed 107 and 108 lb. respectively at twelve weeks. From those figures, most people engaged in pig farming will understand that the breeding of pigs of this stamp means much to the industry.

The Key to Success.

Mr. Harvey has succeeded because he set himself a high standard. His farm is an excellent lesson in the value of methodical working—herd testing, conservation of fodder, and the rearing of what has been proved to be a very profitable breed of cows and pigs and the careful handling of them. By farmers in the surrounding district this fine example is being followed with monetary advantage.

OLD JOURNALS REQUIRED.

The University of Sydney is in need of a copy of each of several issues of this *Journal* to complete its files.

If any of our readers have copies of any of the *Journals* specified below, and are willing to part with them, they will be most gratefully received by the Librarian of the Fisher Library, University, Sydney.

The parts required are—

1902.—January, February, March, October, November, and December.
1903.—Parts II. and III.
1921.—January, February, and July.
1922.—January and March.
1923.—Index only.

PRUNE AND PLUM CULTURE.

(Continued from page 433.)

By J. M. Ward, Superintendent of Horticulture.

FUNGOID DISEASES.

The plum tree, like all other fruit trees, is subject to attacks of different fungoid diseases and insect pests. The fungi and insect pests most common to this fruit are described by officers of the Science Branch:—

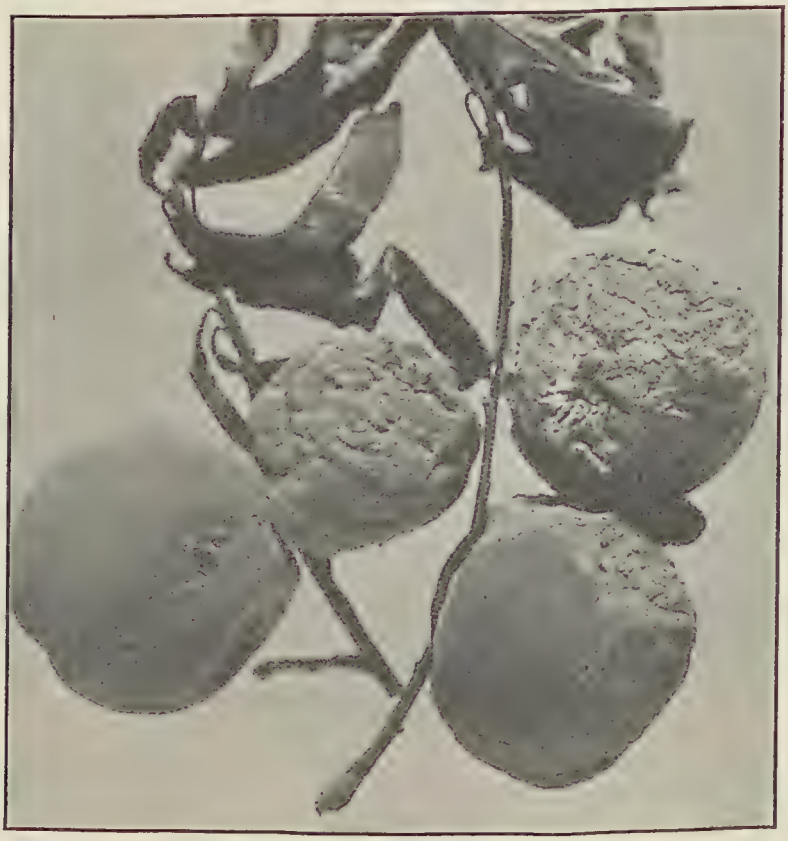


Fig. 73.—Peaches affected with Brown Rot.

Brown Rot. *Sclerotinia cinerea* (*Bon*) Schr.

This is the most destructive of all diseases attacking stone fruit trees. Twenty years ago brown rot was uncommon; in 1914 specimens were received from several districts in Victoria. Orchardists, to some extent, ignored the advice given, and the outbreak became widespread in 1918, and in epidemics then and since then growers have lost entire crops.

Almost every part of the tree is liable to attack—the blossom, the wood, leaf, and the fruit. Blossoms affected by this fungus turn brown and wilt, but do not fall for some time. Leaf infection in Victoria is rare; it is present only during a very wet spring. Twig infection is brought about by the mycelium passing down the fruit-stalk of infected blossoms or through the fruit-stalk of diseased fruit, from wounds in the bark or lenticels. The greatest development takes place in or near the cambium layer, where the mycelium lies dormant till the following spring. Very often small branches or twigs are killed outright. In other cases injury is involved to a strip one side of the branch. This is known as twig blight or die-back. When or before the trees burst into blossom, tufts of hyphae appear on the surface of diseased wood; these have either forced a passage through the lenticel or through small cracks in the diseased bark. Later, chains of conidia (or summer seeds of the fungus) form on the surface of the tufts, and continue to develop through the spring and summer. As conidia develop, they are distributed far and near by air currents; hence diseased twigs serve as the centre from which the disease may spread.

Appearance of the Disease on the Fruit.

Very few orchardists have any knowledge of blossom- or twig-infection; the injury is usually attributed by them to frost. The first visible sign on the fruit is a minute depressed brown spot; this enlarges, and the whole fruit is involved in 24 hours. Conidia (or summer seeds) appear at the centre of infection; later, concentric rings of spores develop from reproduction of the conidia.

A large proportion of the infected crop falls, while some fruits remain as mummies. These mummies are a serious source of infection, as conidia are produced on their surface. Occasionally, under very favorable conditions, ascospores are produced from mummies, but this is not a very common source of infection in Victoria. The main source of infection is from diseased twigs and mummies which have remained on the tree from previous crops.

Muggy weather favours the development of brown rot. It is a serious disease south of the Divide, and requires only a wet January and February for it to be very bad in our northern plum and prune orchards.

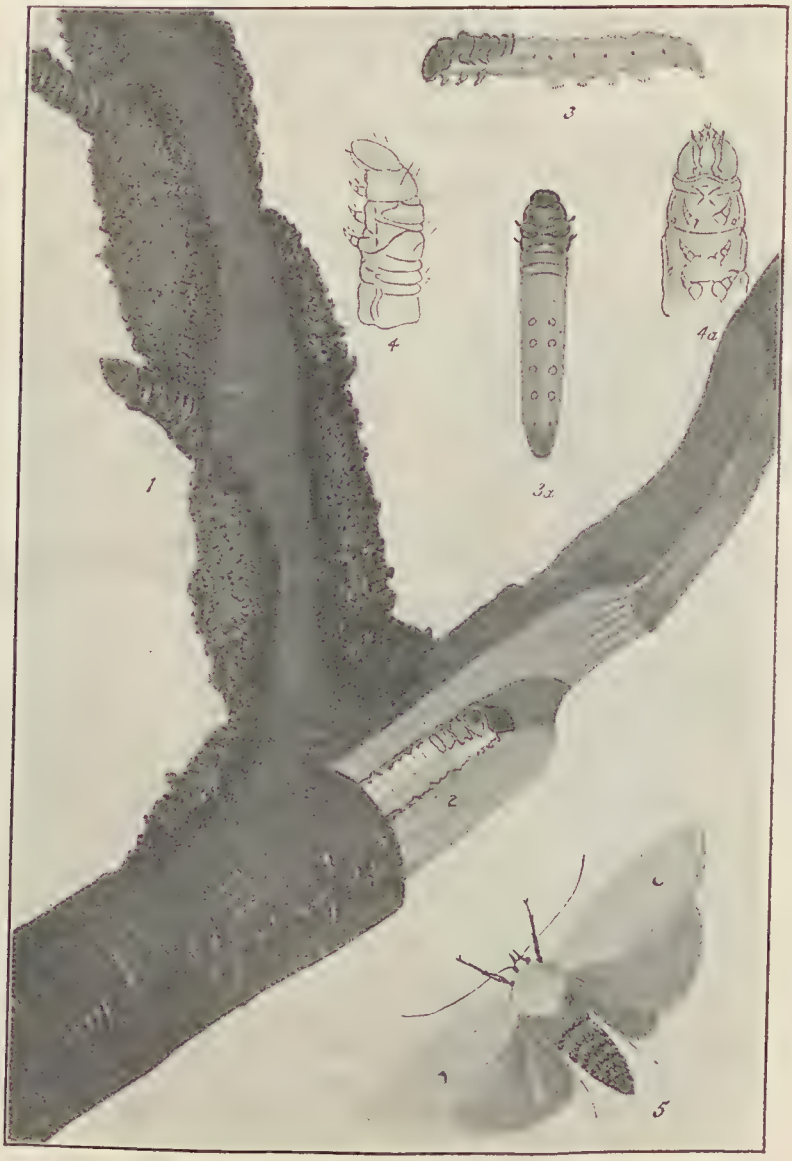
Control.

(1) Prune out all dormant twigs.
(2) Pick off and burn mummies.
(3) Spray trees with lime-sulphur—
  (*a*) Just as the bud begins to swell (1 in 9).
  (*b*) As the buds show pink (1 in 35).
  (*c*) As the fruit begins to colour (1 in 80).
  (*d*) Fourteen days prior to picking (1 in 100).

If weather is dry, the sprayings (*b*) and (*c*) may be omitted.

Prune Rust. *Puccinia pruni* (Pers).

This disease is one of economic importance, and affects the wood, leaf, and fruit. Upon the young wood *uredo sori* develop as golden yellow pustules; at first they are covered, but later break through the outer covering of the bark, forming cracks 1 inch in length. Several



[From French's Handbook of the Destructive Insects of Victoria.]

Plate 74.—Cherry Borer. (*Cryptophasia unipunctata.*)

Fig. 1.—Cherry branch attacked by borers, appearance of sawdust-like covering indicating the grub at work.
Fig. 2.—Larva in bore, where it retires when not feeding.
Fig. 3.—Larva (or grub); top view. Natural size.
Fig. 3A.—Larva (or grub); under view. Natural size.
Fig. 4.—Head and first three segments of larva. Side view.
Fig. 4A.—Head and first three segments of larva; ventral view.
Fig. 5.—Perfect insect. Natural size.

attacks cause serious injury to the growths, resulting in the wilting and death of the twigs. Upon the fruit the disease is seen as more or less brownish scabs surrounded by a red or purple-brown margin. The diseased area becomes hard, and absolutely ruins the fruit for canning purposes. On the leaves golden-yellow blotches are seen, which are very conspicuous on the upper surfaces; on the lower surfaces the pustules are produced in such numbers that the leaves appear to be covered with yellow ochre. The plum leaf spots are first pale yellow on the lower surface, but on the upper surface the whole leaf is very marked. Probably there is a greater development of teleutospores on the leaf of the plum than on any other variety of stone-fruit; these are the brown pustules, and are the resistant spores which carry the disease over to the following year. The injury to the leaf is reflected in a poor crop the next season.

Treatment.

Since the fungus occurs on the stem and fruit as well as on the leaf, all affected parts should be removed and destroyed, so that no decaying refuse left about the orchard may harbour the winter spores (i.e., the ones from the brown pustules).

Bordeaux spray must not be used on peach or Japanese plum trees when they are in leaf. For European plums, spray with Bordeaux mixture (6-4-40) or lime-sulphur (1-15) just as the buds begin to swell prior to breaking. Follow one month after the petals have fallen with Bordeaux (6-4-80) or lime-sulphur (1-80), and give a third spray with Bordeaux (6-4-100) or lime-sulphur (1-100) when fruit is three-quarters grown. Take precautions to burn the diseased leaves, and give a good summer cultivation.

Shot Hole of Plums. *Coryneum beijerinckii* (Oud).

Shot hole is a serious disease in plum trees. The blossoms, twigs or young wood, and leaves are attacked by this fungus. Blossom injury is sometimes mistaken for frost injury, since the blossoms shrivel and fall; occasionally not a blossom is left on the tree. The spores falling on the leaves germinate, the germ-tube pierces the leaf, and the infected cells turn brown; these areas are then cut off from the living tissue by means of corky layer, and so holes are left in the leaves where this dead portion has fallen out. Leaf infection occurs very early, and in bad seasons only skeletons of the leaves remain. On the young wood or twigs the infected portion takes the form of depressed oval areas, darker in colour; the bark ruptures, clusters of spores develop, and very often gum exudes. About the end of autumn, spores from the twigs and leaves become scattered on the buds. With the autumn rains the spores germinate, those on the new wood producing spotting and pitting, caused by mycelium killing a small area of bark. The greatest injury is due to the spores on the bud scales. These germinate and produce mycelium, which penetrates and kills both the bud and portion of the wood.

Control.

(1) Prune off the diseased wood.
(2) Spray with Bordeaux mixture (6-4-40) before the buds break; and
(3) Spray with Bordeaux mixture (6-4-50) after the buds break.

[From French's Handbook of the Destructive Insects of Victoria.]

Plate 75.—Pear and Cherry Slug. (*Caliroa cerasi.*)

Fig. 1.—Branch of pear tree showing young larvae, also upper surface of leaves destroyed.

Fig. 2.—Larvae slightly magnified.

Fig. 2A.—Larvae ascending stem of tree; magnified.

Fig. 3.—Perfect insect. Natural size.

Fig. 4.—Perfect insect; magnified.

Fig. 5.—Section of pear leaf with supposed eggs.

Fig. 6.—Section of edge of leaf with supposed eggs.

The Cherry Borer Moth. *Cryptophasia unipunctata.*

This pest, as its name implies, belongs to the class of wood-boring insects, and its depredations have frequently caused serious loss to plum and cherry growers.

Life History.

Small slate-grey eggs are laid in the crevices of the bark of the tree, and the young larva or caterpillar, on hatching, begins to bore into the bark, passing into the heart-wood later. The perfect insect is a rather stoutly-built creamy-white moth with a black spot on each fore-wing.

Control.

The sawdust-like excrescence on the outside of the tree is a good indication of the presence of the borer. This should be cleaned away, and a teaspoonful of bisulphide of carbon poured into the tunnel. The outlet should be clogged with clay or soap, and the fumes of the bisulphide will then penetrate throughout the borings and kill the grubs. Probing the tunnel with a piece of strong wire will often kill the larvae.

The Pear and Cherry Slug. *Caliroa cerasi* (Linn).

This "slug" is the larvae of the saw-fly, one of a group of plant-eating wasps. The small black eggs are laid in a slit in the leaf, and the larvae, on hatching, immediately begin feeding on the epidermis of the leaves, in bad cases defoliating the trees. The larvae are very similar in appearance to the common garden slug, and, fortunately, are easily killed.

Control.

Arsenate of lead, sprayed on the trees when the "slugs" are noticed, is very effective. Lime, soot, or even fine dust scattered over the tree will be sufficient to dry up the slime on the larvae and kill them.

Scale Insects. *Ciccidae.*

Three of these remarkable insects are of common occurrence on the plum, namely—(*a*) the San Jose scale, *Aspidiotus perniciosus;* (*b*) the Vine scale, *Lecanium berberidis;* (*c*) the Apple Mussel scale, *Lepidosaphes* (*Mytilaspis*) *ulmi,* Linn.

These scale insects early in life form a hard covering over themselves, and, in the case of females, never leave the scale. On coming to maturity, the males emerge as tiny two-winged insects. They feed by means of a long sucker which is inserted into the substance of the host plant, and through which the sap is drawn out.

Control.

Spray with red oil (1 in 12) in the dormant period, and with nicotine sulphate (1 lb. in 80 gallons of water) in the spring when the young insects are hatching.

[From French's Handbook of the Destructive Insects of Victoria.]

Plate 76.—The Plum Aphis.

Fig. 1.—Branch of plum tree showing aphis on leaves and stem. Natural size.
Fig. 2.—Larva of aphis. Magnified.
Fig. 3.—Winged female. Magnified.
Fig. 4.—Winged male. Magnified.
Fig. 5.—Larva. Magnified.
Fig. 6.—Larva. Magnified.

Aphids.

Two species are found on the plum, the plum aphis and the black peach aphis. These insects live most of their lives on the foliage of the trees, over-wintering by means of resistant, hard-shelled eggs; as adults they live on the roots of the tree.

Control.

Spraying with red oil (1 in 12) or lime-sulphur (1 in 9) in the dormant period will kill the eggs, and a nicotine sulphate spray (1 lb. in 80 gallons, with 3 lb. of soap) is effective in killing the aphis in the summer months.

Other Insects Pests.

Other insects attacking the plum which sometimes do considerable damage are plum weevils, *Ecrizothis inequalis* and *Perperus sp.;* these attack young roots and buds. Others are the pumpkin beetle, *Aulacophora oliveri;* cutworms (*Noctuidae*), various species; and the light-brown apple moth, *Tortrix ashwarthana.*

All these may be controlled with the arsenate of lead spray.

In addition the fruit fly, thrips, and the apple-root borer are pests of the plum.

(*Concluded.*)

WORLD'S POULTRY CONGRESS.

To be held in Canada, July-August, 1927.

In 1921, the first World's Poultry Congress was held at the Hague, in Holland, and three years later the second met at Barcelona, in Spain. Arrangements are now being made for the holding of a third congress next year at Ottawa, in Canada. The opening date has been fixed for the 27th July, and it is expected that the sessions will continue for about eight days.

All phases of the poultry industry will be discussed at the Congress, but the managers point out that there appear to be three fields which demand special attention. They are (1) Problems of breeding with a view to increasing production and maintenance of vigour in the stock as well as of racial characters; (2) Disease, which undoubtedly, both in the embryonic and post-hatching stages, is a serious menace to successful poultry husbandry; and (3) Distribution and marketing of produce, so that it may reach consumers at the least possible cost, and in the best possible condition, and yield an adequate return to those engaged in production.

An exhibition will be held at the same time as the Congress, when it is hoped that a collection of birds from many parts of the world will be on show.

Inquiries regarding membership of the Congress should be addressed to Mr. Ernest Rhoades, Secretary, World's Poultry Congress, Dominion Experimental Farm, Ottawa, Canada. Communications respecting the offer of papers to be read at the Congress should be sent to Mr. Edward Brown, F.L.S., who is known all over the world as a poultry enthusiast, and who will be president of the Congress. Mr. Brown's address is 31 Essex-street, London, W.C.2.

EGGS AND MARKETING.

An address by W. C. Rugg, Chief Poultry Expert, broadcast through 3LO.

It has long been recognized by poultrymen in Australia that egg production is the most profitable branch of their industry. That this is so is probably due to the fact that our climate and soils are eminently suitable for the abundant growth of all the varieties of foods necessary for the well-being of the birds. It is because of the abundance of suitable foods that Australian birds in various egg-laying competitions have made world records, and for this same reason Australia must almost certainly become one of the greatest egg-producing countries in the world.

Now, when a country is producing larger quantities of a food than is required for home use, it is necessary to consider how that surplus can be marketed, so as to secure the producer an adequate return for his labour, and so increase the wealth of the country.

It is a true saying that "All the money in the world comes out of the earth," and poultry-farmers possess, in their prolific laying hens, probably the most efficient machines in the world for turning the produce of the earth, in the shape of grain and green foods, into a marketable commodity—EGGS—one of the most perfect foods for human consumption.

As an example of the wonderful capability of the Victorian hen, I would like to tell you that some years since a Leghorn hen, competing at one of the Burnley Egg-laying Competitions, laid in twelve months 312 eggs, totalling 41¼ lb. The hen herself weighed 4¼ lb. So she succeeded in laying nearly ten times her own weight in eggs during the twelve months. It is for this reason that I venture to say a hen is the most efficient machine in the world for turning raw material into the finished article.

It must be remembered that the first call a hen makes on the food she gets is the upkeep of her bodily heat, and for the repair of wastage of bone, feather, and blood; and it is only after these needs are fully satisfied that any of the food taken can be used for the production of eggs.

A new-laid egg contains all the elements necessary for the building up of flesh, bone, tissue, and blood, so it is not surprising that medical men recommend eggs for convalescents, well knowing that nothing will so quickly repair the wastage caused by illness, and restore patients to full health and strength.

Why an Export Trade should be Developed.

We have good reason to believe that the consumption of eggs is increasing in other parts of the world, and there appears to be a wonderful opportunity for Australian poultrymen to build up a sound business in export eggs. This will relieve the local market in glut seasons of the year, and ensure the producer a fair return for his labour.

Up to the present time, very little has been done by Australian poultrymen to grapple with this problem. Each State has taken the

easiest course to get rid of its surplus—sometimes by dumping it into an adjoining State where, for the moment, prices happen to be a little higher than in their home State. There have been spasmodic efforts at exporting eggs to oversea markets, but no definite system has been adopted to ensure that only those of the right quality and weight were sent. Hence, there has been no sustained demand for Australian eggs, and it is doubtful whether many exporters in the past have found the export of them a profitable business. However, the Commonwealth authorities have now under consideration regulations to govern the export of eggs and adoption of these will prevent any but those of the very best quality, packed in suitable containers, being sent out of Australia.

There is now a wonderful opportunity for all the men engaged in the poultry industry to sink their petty grievances and get together and co-operate in trying to put their industry on a sound financial basis.

Every poultry-keeper, be he ever in so small a way, can, and should, help in this export scheme as long as he is producing eggs clean and sound in shell and at least 2 oz. in weight. And he will not only benefit himself, but will help to bring much needed capital into his State.

As far as Victoria is concerned, the export is vital to the very existence of the industry, because of the great increase in the number of birds during the last few years, which means that a large amount of capital has been invested in land, buildings, and appliances, as well as foodstuffs. The feed bill alone on the poultry farms of Victoria runs into many thousands of pounds. It is estimated by a number of commercial poultry-farmers that their birds are costing at least £1 per week per 100 to feed. On one farm known to me, the feed bill last year was over £7,000 for the twelve months. So it is high time the Victorian poultryman set his house in order as far as the marketing end of his business is concerned.

In considering the overseas market, it is necessary to remember that the export season is a short one, approximately four months. Owing to the fact that we are many thousands of miles away, and have necessarily high freight to pay, it is only profitable for us to export eggs during the period when high prices are ruling on the Home market, due to scarcity of supplies. Fortunately, we are so geographically situated that our time of maximum production occurs when the countries overseas are at their minimum of production.

It was demonstrated last year with eggs exported by Mr. J. B. Merrett, under the supervision of the Department of Agriculture, that they could be landed in London equal in quality to those imported from any country in the world. So it behoves the poultrymen of Victoria to follow up this success by sending eggs of such quality this year as will prove to the British merchants that we are earnestly endeavouring to supply them with the first-class article they require.

Increasing Sales within Australia.

As I mentioned before, the export season is a short one, finishing probably early in November. At that time of the year there will be

still great quantities of eggs coming on to the local market, so it will be necessary for the men engaged in the production of them to give serious thought as to how the local demand can be stimulated. This, I am sure, can be done if poultrymen will honestly try to give the public what they are entitled to for their money, and that is a clean-shelled, new-laid egg of good size and quality, put up in an attractive manner. If the people of Victoria could be induced to eat two eggs a month more than they do at present (which is only 2 dozen a year per head), it would mean the consumption of 20,000,000 eggs, and that would put more than £100,000 into the pockets of poultrymen. Surely it is worth the effort.

Mr. Clapp, our Chief Railways Commissioner, has done the fruit-growers of this State a wonderful service in helping them to dispose of their surplus fruit, and I am sure if he were approached by a reliable body of poultrymen he would be only too glad to help in the distribution of choice new-laid eggs from the railway stations, if they were put up in attractive cartons.

Requirements for Successful Marketing.

The first essential in the successful marketing is quality, but poultry-keepers who are producing eggs for market are losing thousands of pounds annually owing to lack of care of their eggs between the time they are laid and the time they reach the consumer. A great deal of this loss can be avoided. The consumer should be given a better article, and if this be done there will be a greater demand for eggs than there is at present, and producers will benefit accordingly.

The preparation of eggs for market is, logically, the producers' duty, but is too often neglected by him. A visit to the premises of some of the agents and some of the distributing dépôts reveals the fact that egg-producers in many instances do not make the slightest effort to send their eggs packed in a clean and attractive manner. On more than one occasion, I have had my attention drawn to cases of eggs which, when opened up, showed the contents badly packed in dirty chaff —large and small eggs, dirty and clean, all mixed together. And it is usually the class who send such consignments that complain most bitterly about the low price of eggs. They cannot, or will not, realize that their method of marketing is one of the principal factors in keeping down prices.

Fortunately, it is only a small percentage of producers who send their eggs in that condition, but that small percentage is enough to do the industry a lot of harm by lessening the demand for one of the most nutritious and health-giving foods that is produced for human consumption.

How Eggs in the Shell may be Tested.

The quality of eggs in shell is judged by their transparency, and testing before a strong pencil of light has long been accepted as the only satisfactory commercial method of determining quality without breaking the shell.

This process, known as "candling," can be carried out with electric light, gas, or oil lamps, as well as with a candle. On candling, a new-laid egg appears clear and transparent, and there can be no mistake

in detecting the stale egg. In the case of the fresh egg, the white looks clear, whilst the yolk is vaguely seen as a sphere in the middle, tinted rosy red, with a slightly darker tinge towards the centre. The air chamber, which is at the large end of the egg, is about one-eighth of an inch high, and has a diameter of about the size of a three-penny piece.

Some of the more progressive agents and distributors have found it necessary (in order to safeguard their own interests) to take up the duties which should be performed by the producer on the farm, namely, testing and grading, before selling to grocers and other retailers.

These egg-merchants who grade and sell strictly on quality deserve the support of both producers and consumers, because it is the only way in which a business can be built up on sound lines, and it will eventually gain the confidence of the public and lead to increased consumption.

The Dirty-shelled Egg must be Banned.

The marketing of dirty-shelled eggs is, in my opinion, one of the chief causes of low prices and lessened demand by the consumer. For this, producers themselves are solely responsible. A dirty shell not only spoils the appearance of the egg, but bacteria from the dirt may penetrate the pores of the shell and affect the wholesomeness and flavour, especially if, as is frequently the case, the eggs are damp as well. Dampness is likely to produce mould-spots inside the shell, and these impart a musty flavour. Buyers do not favour eggs which have been washed, but prefer the naturally clean article. This the poultryman can obtain by practising cleanliness at every stage, beginning with the laying pen, by the use of suitably constructed nests, and by frequently changing the nesting material. Stained eggs are of poorer quality than eggs carrying surface dirt, as stains indicate contact with moisture.

It is bad practice to clean the dirty eggs with water or a wet towel, as in the act of cleaning the foreign matter is mixed with the water, and in this state penetrates the pores of the shell, with harmful results to the eggs.

On the Continent, all poultry-farmers pay very great attention to the cleanliness. In a report on egg marketing published by the British Minister of Agriculture, it is stated that at the Barnveld Market in Holland, where over a million eggs are brought in weekly, a dirty egg is practically never seen. Further east, in Holland, observations at certain country markets showed that not one egg in 1,000 was marketed dirty, even in bad weather.

There are some internal faults in eggs not readily seen by the producer unless inspected before a strong light. The most common are what are known as "blood spots." These are caused by the fracture of tiny blood vessels as the yolk leaves the cluster, or in its passage through the oviduct. These small drops of blood are enclosed in a thin membrane, and are usually attached to the yolk, which eventually is surrounded by the albumen or white, and finally by the shell. Sooner or later this foreign matter will decompose and give rise to bacterial growth in the eggs. Such eggs should never be sent for cool storage or export, nor even placed in a fresh state on the local market.

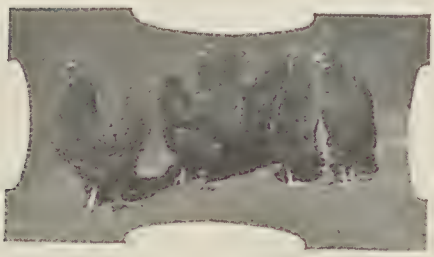
Clean and Attractive Marketing Absolutely Necessary.

In conclusion, I would strongly urge all poultrymen to give serious attention to this matter of marketing eggs in as clean and attractive a manner as possible, for it is not only necessary to develop our export trade, but it is most important that every effort should be made to increase the consumption in our own State.

Attention to the following details will help: Clean yards; clean houses; clean nests; clean foods; clean birds, inside and out. Eggs should be gathered twice daily and kept in a cool place not over 60 deg. F., and forwarded to market twice a week if possible. They should be packed in clean, odorless wood pulp fillers, with a pad of wood-wool top and bottom. If wire fillers are used, the wires should be lined with felt or paper to prevent the wires marking the eggs.

Do not use chaff; it is insanitary, wasteful, and often taints the eggs. See that your boxes are plainly marked "Eggs with care"; this will ensure more careful handling in transit.

If you wish to prosper in your business and you have the welfare of your country at heart, you will give earnest consideration to what I have said to you to-night.



TANNING OF HIDES.

The methods suggested hereunder for the curing and tanning of hides were originally printed in a New Zealand weekly, which states that the recipes are vouched for by a southern farmer.

To tan a horse-hide for straps, first remove the hair. To do this, mix for an average-sized hide about a peck of air-slaked lime in half a barrel of water, and stir briskly. Then immerse the hide and let it remain from three to five days, stirring two or three times daily. Try from time to time to remove the hair with any blunt tool, such as the back of a case-knife; remove all the hair, then rinse in clear water. Then make a solution of 3 lb. of crushed alum, ½ lb. of saltpetre, and 1 to 2 lb. of salt. Put these into enough water to fully cover the hide. Let it remain two weeks, stirring once or twice daily. At the end of two weeks the hide will be tanned. Tack the hide out on a smooth place, such as a barn door, stretching in all directions. Get out all the wrinkles, and when nearly dry rub it with tallow, and, if at hand, good cod oil, rubbing it in well. Then roll it up for a few days; keep it in a warm place, not hot, away from the sun. Soften by rubbing well, and, if necessary, use more tallow. If it is to be blackened, do it before any tallow is put on. Use 4 oz. of nutgalls, 8 oz. of copperas, dissolved in one quart of vinegar or cider, soaking the hide overnight, or 24 hours, if necessary. This method can also be used for cow hides and calf skins.

For tanning hides with hair on, make a mixture of 3 lb. of carbonate of soda, 2 oz. each of nitrate of potash, common salt, pressiate of potash, sugar of lead, and pulverized copperas, and 9 gallons of water. Place the hide in this solution for two hours, remove carefully, and rinse in cold water. If the hide is stiff, dip it repeatedly in this mixture: A gallon of soft soap, 1 quart of fish oil, 1 oz. of borax, 4 oz. of salt, 4 oz. of alcohol, and 2 quarts of hot water. This method is especially for hides to be used as rugs. To tan any kind of skin with hair or wool on, or without: Take 1 lb. of alum, 1 lb. of Glauber salts, ½ lb. of salt, ¼ lb. of saltpetre. Dissolve in warm water. Soak, work, and dress.

When tanning sheep skins with the wool on or off, remove all fat meat from the skin by scraping with a blunt-edged knife. Soak the pelt in a bath composed of 1 lb. of alum and a quart of salt, with enough water added to cover the pelt. Put the vessel away in a warm place, and turn the skin in the liquid daily. After a week, remove the skin and dry it. When partly dry, rub and stretch the skin to complete drying. If you want sheep skins for leather, remove the wool before putting into the alum and salt bath. To remove the wool place the pelt with the flesh side up and sprinkle with quicklime. Moisten the lime and leave for 24 hours, after which the wool can be pulled. The lime can be put on the wool side of the pelt, but it injures the wool more than if put on the fleshy side. To tan hides with the hair on for mats or rugs, wash the skin, and remove all fleshy matter by scraping, then wash the hair side with warm water and soap, and rinse. Take ¼ lb. each of salt and pulverized alum, ½ oz. of borax, and dissolve in hot water. Add enough ryemeal to make a thick paste, and spread on the

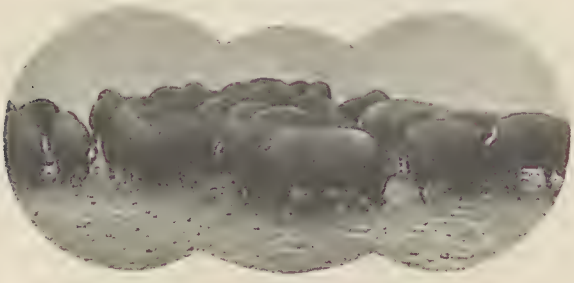
flesh side of the skin. Then fold lengthwise with the flesh side in. Let remain two weeks in an airy and shady place, then unfold, shake well, wash the flesh side in water, and scrape with a dull scraper. Pull and stretch, and work until dry. The amounts mentioned are enough for sheep skins; for larger skins, use more in proportion.

PIG BREEDING IN ENGLAND.

Two volumes of the *Pig Breeders' Annual* for 1924 and 1925, issued by the National Pig Breeders' Association, contain much information of value to those connected with the pig industry. Articles by eminent agriculturists deal with every branch of pig rearing and marketing: e.g., breeding and breeds, feeding, systems of rearing, diseases, slaughtering, curing, marketing, bacon factories, pig societies, statistics, accounts; and the volumes also contain some very fine photographs both of live animals and dead meat.

In the forewords to these volumes the importance of the pig industry is stressed, and suggestions made for improving home production in order to be able to compete with foreign competition. An increase in the numbers of pigs will not suffice to improve the situation, unless the quality and price compare favorably with those of the foreign product. The inclination of the pedigree breeder to breed for the show ring rather than for the market is deprecated, while the breeder catering for the direct production of food is warned of the necessity for keeping only first-class stock animals.

In a short comparison between England and Denmark it is pointed out that Denmark has no natural advantage over England; her farmers have to purchase foreign-grown corn and offals, and she has no particular breed which is better than the English breeds. The difference lies largely in the fact that the Danish pig-man thinks only of the bacon factory, and his sole aim is standardization. Further, he sells direct to the bacon factories through co-operative channels. The two ends, therefore, which pig-owners in England should keep constantly in view are *uniformity of output and collective marketing.*



PIG BREEDING EXPERIMENTS IN SWEDEN, 1924.

The experiments undertaken during 1923 by the Department of Animal Husbandry of the Swedish Agricultural Experiment Station in order to ascertain the bacon-producing qualities of Swedish pig stocks were continued during 1924 on the same lines.

The chief object of these experiments has been to bring out and compare with each other the productive qualities of the Swedish farm breed on the one hand, and the Swedish Yorkshires on the other. A number of investigations into matters of detail were also carried out, and the results arrived at in these various respects may be summed up as follows:—

> The two breeds have shown very similar results, both as regards rapidity of growth, food results, and slaughtering, and as regards quality of meat and classification. The different breeding stocks within each breed showed, however, striking differences in almost every respect, and considerable differences as regards the tendency to inherit certain valuable qualities were also shown in the case of different families and individual animals.

Since the work of classifying the bacon was guided by the requirements of the export trade, the various price-classes are differentiated according to live weight at slaughter, slaughtering loss, proportion of export bacon, and, above all, thickness of back fat and length of the carcass. The animals which were placed in Class I. during the year have shown an average weight of 203 lb., and average length of 36.5 inches, and a thickness of back fat of 1.44 inches. The slaughtering loss within this class has amounted to 25.7 per cent., and the amount of export bacon to 62.1 per cent. of the live weight.

The live weight of the animals has proved to have a particularly great influence on the slaughtering results. It was found that the best results were obtained when animals were killed at an average weight not exceeding 198 lb. With regard to sex, it was found that sows consistently attained a better classification than boars. The length of the animals, too, has a great influence upon their growth, on the quality of the meat, and on the classification, and it was found that the longer animals were greatly superior.

The results obtained clearly favour the well-developed belly. With regard to daily increase in weight and food consumption per kg. of increase, it was found that the present results are considerably better than those based on the practical fattening experiments with common fattening pigs previously carried out by the Central Experiment Station. In the present experiments the average daily increase in weight was 22.49 oz. for farm breed and 22.316 oz. for Yorkshires. The average amount of food units required to produce an increase of 1 lb. in weight was 3.51 lb. for the farm breed and 3.59 lb. for Yorkshires.

GRADING OF EGGS IN CANADA.

During the past decade, the poultry industry of Canada has undergone a phenomenal growth, until it ranks at the present time as her fourth agricultural industry. For some little time, Canada has insisted on the grading of eggs for the export trade, realizing that by so doing it would be possible to build up confidence and a strong market in other countries. Four grades of fresh eggs were accordingly established, the grading based on size as well as on quality. The grades were: "Specials," "Extras," "Firsts," and "Seconds." All eggs for export which were graded and passed had a maple leaf stamped on the end of the case, and soon there sprang up in other countries an active demand for the graded eggs which came under this maple leaf emblem. Having placed the export trade of eggs on this solid footing, the next step was to give a graded product to the consumers of Canada, to ensure them the same satisfaction in purchasing eggs at home as a foreign importer could receive purchasing eggs in Canada. Accordingly, in July, 1923, regulations were introduced requiring that eggs sold to the domestic trade be uniformly graded. The following are the descriptions of the various grades of eggs:—

"Specials."—The very cream of Canadian eggs, produced largely on the specialized commercial poultry farms of the country. They average in weight 25 oz. to the dozen, are absolutely fresh, and of the highest quality.

"Extras."—These are slightly smaller than "Specials," weighing at least 24 oz. to the dozen. They are a first class product, and form the bulk of the demand for high-quality eggs.

"Pullet Extras."—Of the same quality as "Extras," but smaller.

"Firsts."—These eggs are not of the same high quality as "Extras" and are slightly smaller. They can be used for cooking, or can be served alone or in combination.

"Seconds."—This class constitutes all eggs which are fit for food but which are not found in the other classes. They may be used in cooking, but are not sufficiently uniform in quality or flavour to be used alone or in mild-flavoured dishes.

POPULARITY OF THE SMALL FARM IN FRANCE.

In the course of a recent article, a French writer claims that the success achieved in the last twenty years by agriculture in Brittany is due to the fact that for centuries past the big estates there have been broken up into smaller farms of from 25 to 50 acres in extent. Small holdings are, it seems, much more in demand in France than larger farms, and if a 400-acre holding is divided up into eight smaller holdings of about 50 acres each, the letting value of the whole estate will be about double what it would be if the large estate were left intact. In the north-west of France, 50-acre farms are letting to-day at a rental of 200 francs per acre, while farms of 250 acres do not find tenants at half that figure, and even 100-acre farms fetch less than the smaller holdings, largely because of the scarcity of labour in Normandy.

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

If the winter spraying has been delayed, it should be completed as quickly as possible, and before the buds begin to swell and burst.

It is not advisable to spray the stone fruits with the red oil emulsion at this time, as there is danger of burning and destroying the early buds that may be swelling, and consequently loosen their outside scales. It will be safe, if the work be done at once, to spray apple, pear and quince trees with this spray, especially where the Byrobia Mite, scale insects, or woolly aphis are prevalent.

If it is intended that the lime-sulphur wash be the specific for these and other pests, it may be used with safety, although the spraying should be completed as early as possible.

That the lime-sulphur is valuable as a specific against "Black Spot" of the apple was shown in the report of the experiments in the *Journal of Agriculture* for August, 1918. The first spray should be given when the flower buds are more green than pink; and the second spray, when the centre flowers of the blossom cluster are pretty open.

The same report showed that a spray of 6.8.40 of copper-soda, sprayed when the earliest buds were showing pink, was a complete success against the "leaf curl" of the peach.

Where peach aphis has appeared, it will be advisable to spray at once with a strong nicotine solution. Tobacco stems should be soaked in cold water for some days, and a teaspoonful of caustic soda added to a cask of steeping stems. The liquid should be made strong, and every endeavour made to kill out the first insects that appear. The preparations known as Black Leaf 40 and Nicotine Sulphate are useful for this work.

Experiments carried out by the Government Entomologist in 1923 determined that red oil and nicotine sulphate mixed provided an efficient spray for woolly aphis. The mixture was made up of 1 gallon of red oil, 1 pint of nicotine sulphate, and 1 lb. soap, the latter being boiled till dissolved in 1 gallon of water. The red oil was then mixed in, and lastly the nicotine sulphate. To this was added 80 gallons of water. This provided spray material for 100 trees, at a cost of about 11s.

The pruning of deciduous trees should be at an end this month. The pruning of evergreens such as oranges, lemons, and guavas, may be left until later.

Young deciduous trees must be planted not later than this month. The soil should be trodden firm round the roots, and, when planting has been completed, the tree ought to be headed back to three or four buds on each arm.

Preparation may be made for planting citrus and other evergreen trees. It is necessary that the soil be well ploughed and sweetened in anticipation of planting in September and October.

In root-borer affected districts, the beetles will begin to appear during the latter part of the month. A close observance should be kept on them and the insects regularly collected and destroyed.

The Flower Garden.

All winter-flowering shrubs that have dropped their blossoms may now be pruned. It is important to prune these immediately after flowering, so that the plant may be able to make plenty of flowering wood for next season.

Seed beds and plots need constant cleaning and weeding. Weeds must now be kept out of the garden, both by hoeing and hand picking. The seedlings growing in their permanent situations should be thinned out and given a good chance to develop strong and sturdy plants.

Divisions of herbaceous plants such as delphiniums, cannas, shasta daisy, herbaceous chrysanthemums, rudbeckias, salvias, and phlox may still be planted out. If it is intended to leave the plants in the places they occupied last season, they should be lifted, the soil being well dug and manured, and the crowns planted back again. By this means the plants retain their vigour, and are able to produce good flowers each season.

Evergreen shrubs may now be planted out, if the spots chosen for them have been well dug and aired. All beds should be well dug over by this time, manure and refuse litter having been dug into the soil.

A few corms and tubers of early summer flowering bulbous plants, including Gladioli, may now be planted. Gladioli so planted will bloom in December.

The Vegetable Garden.

The plots should be well dug over at this time, adding gypsum or lime where any pests have been prevalent. In other beds stable manure should be well worked into the soil.

The soil should be rich, well worked, and warm, so that a quick growth may result. Vegetables quickly raised are generally more tender than slowly grown ones; and frequent changes of crops in the plots will give better results. At this season, the weeds will require constant checking; frequent use of the hoe will, therefore, be necessary, and in the rows hand-weeding should be resorted to.

All seedlings should be planted out, especially seedlings of cabbage, cauliflower, lettuce, and onion. Seeds of peas, carrots, parsnips, radish, lettuce, tomato, and broad beans may be sown. Add 2 oz. per square yard of nitrate of soda to the cabbage beds.

Where they can be sheltered and protected from frosts, young tomato plants may be planted out for early fruiting. One method of managing

these early plants is to place the young plant a few inches below the surface, and then a box, 8 or 9 inches deep, with top and bottom removed, over the plant at ground level. This can then be covered loosely with a piece of glass whenever necessary.

Potatoes, artichokes, and asparagus crowns may be planted. Asparagus beds should be kept free from weeds; they should have a loose surface, and a good top dressing with old manure would be beneficial.

In the frames, cucumber, vegetable marrow, melon, pumpkin, water and rock melon seeds may be planted. These are best planted in pots, placing three or four seeds in each pot; they then suffer no check when being transplanted into beds.

REMINDERS FOR SEPTEMBER.

LIVE STOCK.

Horses.—Feed stabled horses well; give green stuff if available. Continue rugging to encourage the shedding of the coat; good grooming will also be beneficial. Give hay or straw to grass-fed working horses. Feed old and badly-conditioned horses liberally. In foal mares due to foal early, if worked, should be turned out to paddock. Stallions doing stud duty should be fed liberally. Equivalent amount of cracked Indian corn (maize) may with advantage be substituted for oats, if latter grain is scarce.

Cattle.—Cows should still be rugged, but coverings should be removed frequently, in order to enable the animal to get rid of the old coat, or, better still, a good curry-combing may be given. Continue hay or straw. Look up treatment for milk fever in leaflet issued by Department, and treat cattle accordingly. Give calves a good warm dry shed. Give the milk to young calves at blood heat. Have feeding troughs or buckets clean. Don't over-feed. Feed regularly with regard to quantity and time. Provide a good grass run, or fine hay or crushed oats in a box or trough. Give a cupful of limewater per calf per day in the milk. The problem with many at the present time is how to rear calves without milk. This can be done very well by starting them on new milk for a fortnight, and then gradually substituting the milk with one of the calf meals on the market. To these it would be advisable to add two or three tablespoonfuls of cod liver oil. The following meal is in general use in Ireland:—Two parts, by weight, of oatmeal, 2 parts maize meal, 1 part pure ground linseed, all finely ground. Scald with boiling water, and allow to stand for twelve hours. Start with new milk, then gradually substitute skim and ¼ lb. of the meal mixture per head per day, gradually increasing to 1 lb. or more. In a month milk may be dispensed with altogether. The crushed oats, fed dry, have been found to give excellent results.

Write for Departmental Bulletin on rearing calves.

Pigs.—Supply plenty of bedding in warm well-ventilated sties. Keep sties clean and dry, and feeding troughs clean and wholesome. If pigs are lousy dress with kerosene emulsion or sulphur and lard, rubbing well into crevices of skin, and disinfect sties. Worms are very prevalent at present, and may be treated by giving 2 to 10 grains of Santonin in form of pill, or from half to one teaspoonful of oil of turpentine in milk or castor oil. Read Bulletin 16.

Sheep.—Early-shorn sheep usually thrive, and can be fattened quickly. This is important where it is intended to sell old ewes that are of no further use for breeding purposes or for wool production. Strong Crossbred two-tooth wethers that were unsuitable for export can also be fattened quickly when shorn. Lambs not good enough for freezing should also be shorn early, as they will then fatten on the spring grass, and may be made good enough for the butcher.

Suitable shelter should be available for the protection of sheep off shears, particularly in the early spring months. Where insufficient knowledge of classing crossbred wool exists, draft the coarse sheep from the fine sheep before they enter the shearing shed; there will then be no difficulty in baling the wool separately. All dags should be removed before the sheep are carried by the shearers to the board. When the wool is on the table, avoid deep and careless skirting on small flocks; only very seedy parts, heavy fribs and stains should come off fleeces. Press in a box press, which forms square sides to bales. A printed pamphlet, setting out the quantity of wool of each class to be put in a bale, is to be had from most wool-selling firms. Brand bales boldly and neatly on the flat side, or adopt any particular directions suggested by your wool broker.

The shed should be very well cleaned of all straw, chaff, dust, &c., before shearing starts; also wash the shearing board down, and at the same time add some disinfectant to the water. Cut back all misshapen feet at shearing time, and treat if necessary. All sheep off shears should be branded clearly; avoid branding on ribs and shoulder; use rump and poll for this purpose. Broken-mouthed ewes, ewes with faulty udders, yellow and common fleeces should be culled and fattened for sale. Well-bred ewe weaners should be classed, and the best retained for future flock purposes. Wool with character deep-stapled, fine to medium grade, will be in keen demand for years. Character is denoted by the crimp, which should be even and well defined.

Place wool pack in press with the sewn seams towards the fixed side of the press.

Poultry.—September is the last month for hatching for winter eggs. Incubators should be kept going, and broody hens set. Care must be taken to keep down vermin, as they now breed quickly; use sprays in houses and Insectibane or Izal in nests—nothing stunts chickens quicker than vermin. The food for young chicks should be fine oatmeal, biscuit meal, or finely-ground wheat, a little calcined bird's grit, a little chopped green stuff such as lettuce, thistles, or green lucerne or spring onions occasionally cut fine is a good tonic, and a pinch of powdered charcoal. Slightly moisten with new milk. Make the whole friable, and feed frequently ("little and often") just as much as they will readily eat, as an excess of food only sours and disturbs their digestive organs. Animal food may be given in small quantities after the first ten days once or twice a week. Chickens should be protected from damp ground and the cold, bleak winds.

CULTIVATION.

Farm.—Plant early potatoes, and work up fallow for the main crop. Keep fallow for summer forage crops well worked up with the disc and harrows. Make early sowings of mangolds, beet, field carrots, and turnips. Push on with the fallowing in the Northern Districts. Prepare land for tobacco seed beds by burning rubbish on the site; afterwards work up to depth of three or four inches.

Orchard.—Commence spring ploughing; plough in leguminous crops for green manure as soon as the plants are in full flower. Finish grafting early in the month. Spray peach and apricot trees with copper soda as the blossom buds are opening, as a preventive of "leaf curl" and "shot hole" fungi; watch for peach aphis, and spray when present with tobacco solution.

Flower Garden.—Cultivate and work up the surface to a fine tilth—clear out all weeds. Water newly-planted shrubs, &c., if the weather is dry. Plant out cannas, early dahlias, chrysanthemums, gladioli, and other herbaceous plants.

Vegetable Garden.—Plant out seedlings. Sow seeds for summer use, such as tomatoes, cucumbers, marrows, pumpkins, melons, &c. Plant out tomatoes and shelter till frosts are over. Hoe and work up the soil surface.

VINEYARD.

Plantation of young vines (grafted or ungrafted) should be concluded before the commencement of September; pruning of old vines likewise, as well as twisting or tying of rods on long-pruned vines. Prune recently-planted vines just before buds commence to swell (if not pruned when planted), cutting strongest cane back to two buds. Do not delay this work until buds have shot, as this seriously weakens the young vine. Field grafting may be carried out, if weather be fine and warm. If cold and wet, postpone until October. Swabbing of susceptible sorts (Black Spot control) should not be omitted this wet season. It must be completed before vine buds swell (see last month's reminders). A bulletin (No. 42) dealing with vine Black Spot, will be posted on application. Cultivation (scarifying or discing) must receive attention when soil is in suitable condition.

Cellar.—Conclude spring racking early in month, if not already done. Fill up, regularly, all unfortified wines.

BEEKEEPING.

During the first or second week of September all hives should be examined to see that each colony has a laying queen and sufficient stores of honey to permit of normal development. Bees work better with a reserve of stores at this time of year, and when their supplies are reduced to a certain minimum, brood rearing is restricted, and may cease altogether for a time, and when, as a result of prolonged unfavorable weather, the reserve stores are used up, even sealed brood may be torn open and thrown out, and the colonies practically ruined for the season.

Strong colonies should have 15 to 20 lb. of honey ahead of daily requirement, medium and small colonies proportionately less. When during the examination of the hives less than this amount is found, the shortage should be made good by feeding, blood-warm, and inside the hive, a syrup made by dissolving 1½ or 2 parts of best white sugar in one part of boiling water. What is known as a frame feeder is the most suitable one for this purpose, or a simplicity feeder in a shallow super over the brood chamber may be used.

When no feeders are on hand, the syrup may be poured in a fine stream from the lip of a jug into an empty comb laid flat into a suitable dish. The jug should be held about 12 to 15 inches above the comb, otherwise the syrup will not enter the cells. After filling both sides, and keeping it in an upright position for a few minutes to drain off the surplus, the comb can be returned to the hive, repeating the operation on succeeding days till the needs of the colony are supplied. Honey of unknown origin should never be used for feeding on account of the risk of introducing disease.

Any colony found queenless, as indicated by the absence of brood or eggs, may be kept going till a queen can be raised or procured, by giving a comb of eggs or young brood from a strong colony once a week, provided there are sufficient bees left to make it worth while; if too small, unite with the nearest normal colony.

In early districts and where colonies went into Winter strong in bees, swarms may be expected from the middle of September onwards. Hives and frames for the number of first swarms expected should be on hand and ready for immediate use, so that none of the bees' labour may be wasted by allowing them to build comb in a temporary box. All frames should be wired so that newly-built comb may not break down in handling or during hot weather. Under normal conditions a swarm with a good fertile queen will build all worker comb during the first three weeks. It is the only time a full colony will not build drone comb from starters of foundation. While the queen deposits eggs into the worker cells as fast as they are constructed by the bees there will be no drone cells built. After three weeks the young bees from the first-laid eggs will hatch out, and the queen will return to that part of the comb to again deposit eggs into the vacated cells, and the newly-constructed cells on the edges of the comb being neglected by the queen, the remainder of the space in the frames will be filled with drone comb.

The aim of the bee-keeper, therefore, is to confine the building of comb from starters to the number of frames likely to be completed during the first three weeks after hiving the swarm, by removing two, three, or four frames in which no comb has been built four or five days after hiving. The follower or dummy board is pushed up against the remaining frames, and when these are completed frames with full sheets of foundation are added to make up the set.

Hives should always stand level, crossways to the frames; in the case of swarms hived on starters of foundation it is particularly important. Comb is always built truly perpendicular, and if the hive is not level to the frames the wires will be outside, instead of in the centre of the comb.

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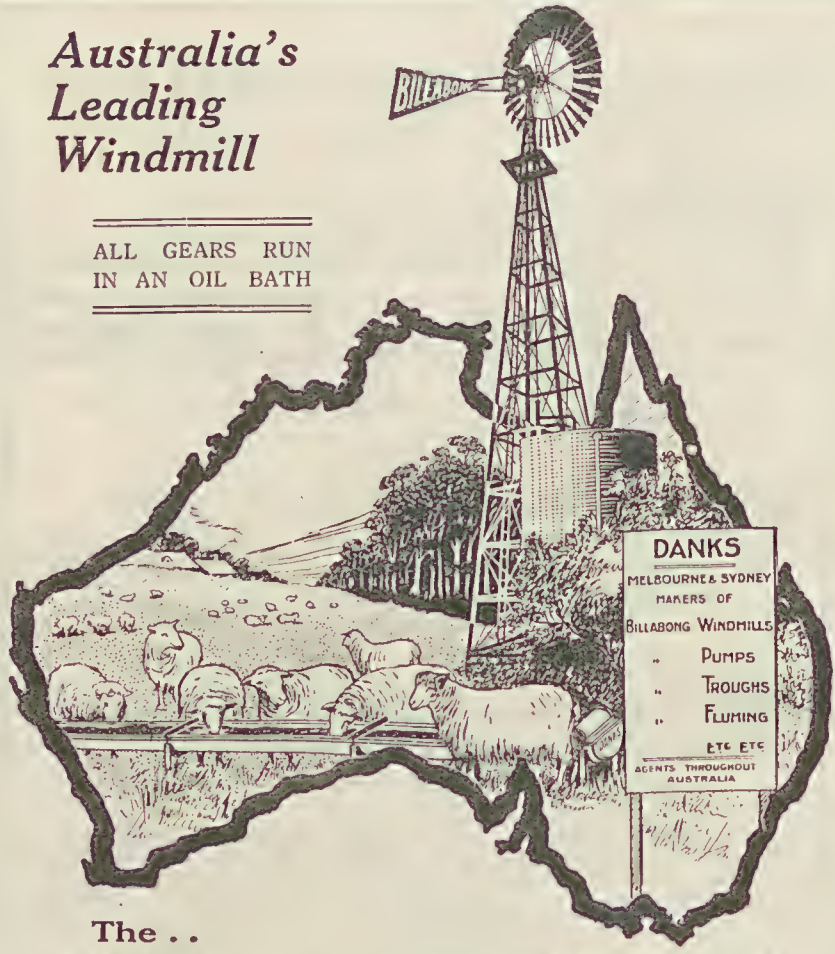

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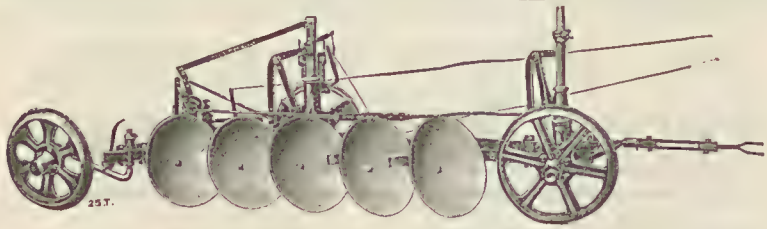

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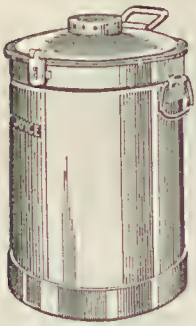

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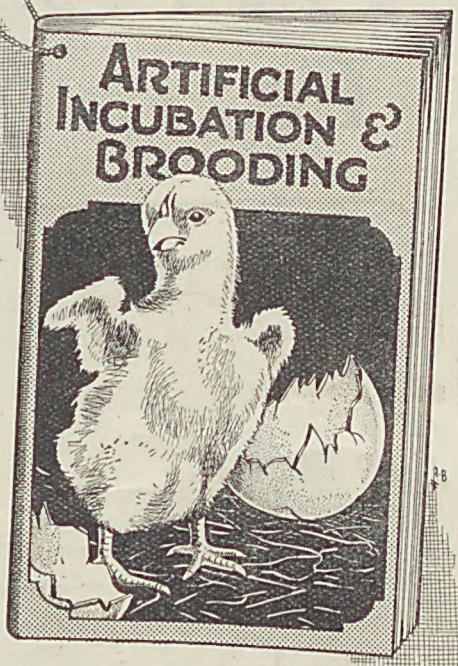

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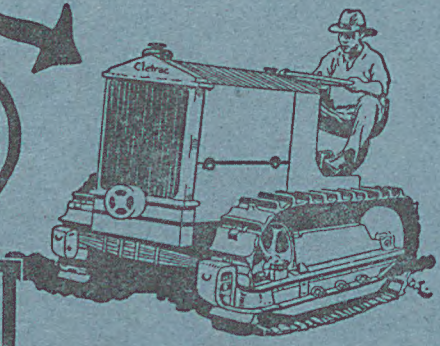

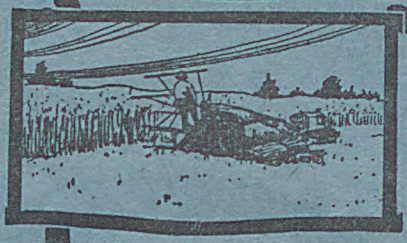

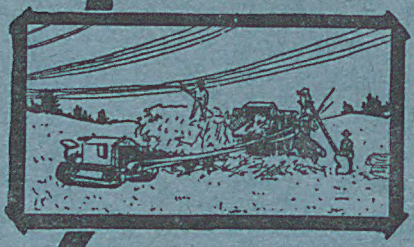

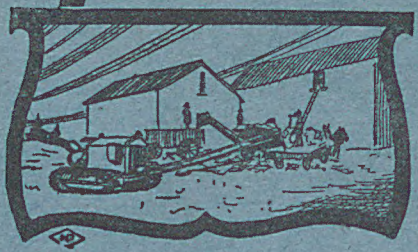

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